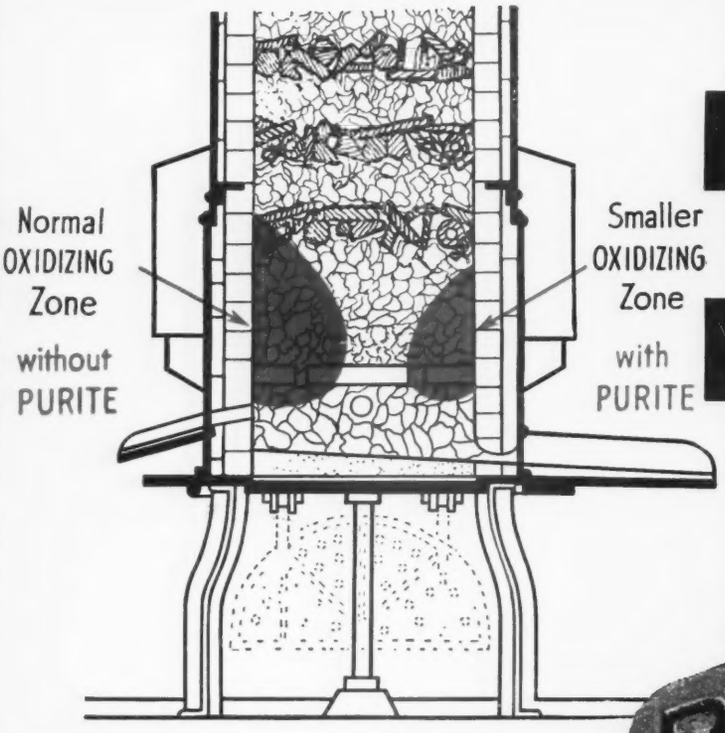
DECEMBER 1952

FOUNDRY

...WHEREVER METALS ARE CAST

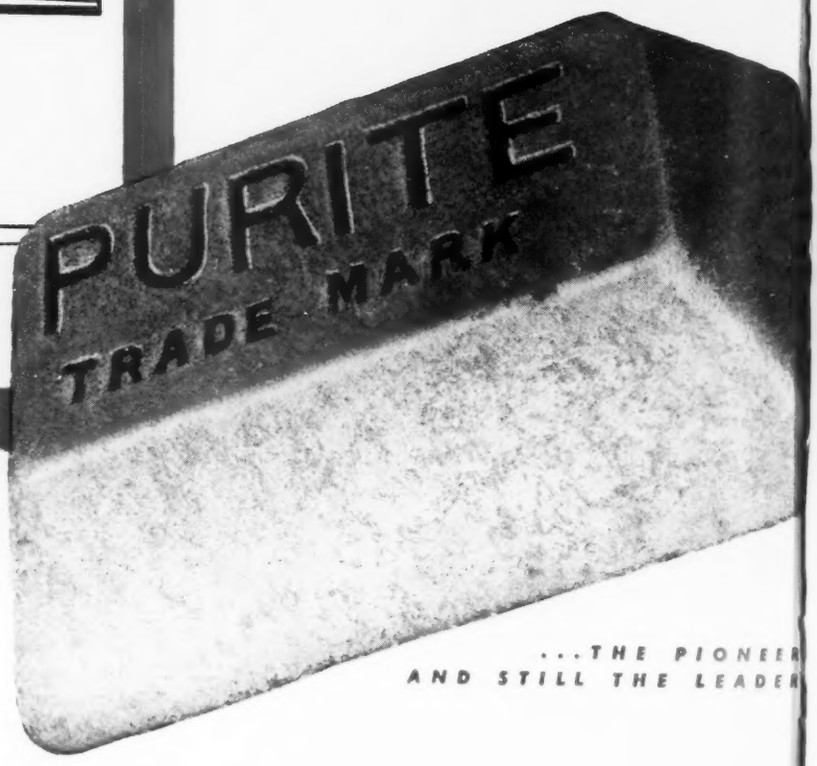
PUB[illegible]BRARY
NOV 26 1952
DETROIT

Season's Greetings



Keep Production Unifor

with PURITE in Every Me



Purite produces a sodium (yellow) flame in the melting zone of the cupola and accelerates the combustion reactions $C \rightarrow CO_2 \rightarrow 2CO \rightarrow 2CO_2$, thus speeding up the combination of oxygen in the blast and carbon in the coke. In this way, Purite limits the zone of free oxygen in the cupola to a smaller hotter area, reduces oxidation of the metal and increases melting temperatures.

To get top production of finished castings from every melt, be sure you flux and desulphurize with Purite. It forms a highly active refining slag in the hearth of the cupola which expels entrapped gases and reacts with the impurities picked up by the iron in trickling down over the coke. Non-metallic inclusions are converted into liquid sodium-silicates that rise out of the metal and are carried off in the slag. Thus Purite, by expelling the impurities, which cause pinholes and segregated defects, improves the soundness and machinability of iron castings and reduces foundry losses.

For over 30 years, Purite has been the choice of leading foundries everywhere. Here's why:

1. Purite produces a higher percentage of finished castings per ton of metal poured.
2. Purite gives 100% fluxing action in the cupola—100% desulphurizing action in the ladle.
3. Purite gets to all the iron quicker.
4. Purite is time-tested and proven for unsurpassed desulphurizing uniformity.
5. Purite comes in 2-lb. pigs and 2 oz. tablets—no weighing or measuring required.
6. Purite is 100% pure fused soda ash—you do not pay for inert materials.
7. Purite does not crumble—no waste—no dust.
8. Purite can be shipped in bulk carloads at substantial savings over bag shipments—is easily stored without deterioration.

Purite, the scientific flux for better melting and cleaner iron, is sold by leading foundry supply houses in the United States and Canada. Mathieson Chemical Corporation, Baltimore 3, Maryland.

Mathieson
CHEMICALS

SERVING INDUSTRY AGRICULTURE AND PUBLIC HEAL

FOR FASTER, EASIER, LOWER COST FINISHING OF GRAY IRON CASTINGS

'NISILOY'*

(NICKEL-SILICON-ALLOY)

• WHAT IT IS

"NISILOY" is an inoculant with positive graphitizing power. It contains about 60% nickel, 30% silicon, balance essentially iron. Its remarkably low melting point of 1800° F. and relatively high specific gravity causes it to dissolve quickly in liquid iron.

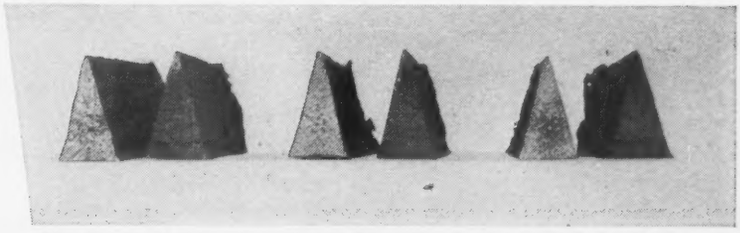
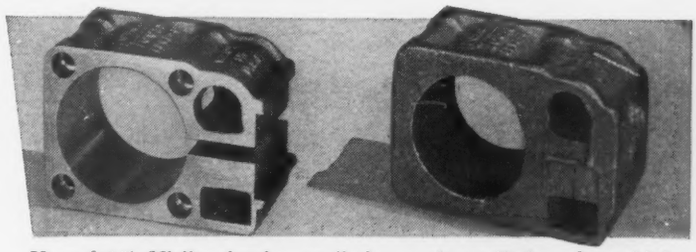


Photo of 1" chill test bars show advantages of Nisiloy. In each pair, wedge on left is white, and was cast without Nisiloy. Right hand wedges used progressively 1 to 1½% Nisiloy. Notice complete elimination of hard white iron on specimen at extreme right.

• WHAT IT DOES

"NISILOY" improves machinability . . . it provides a dense, gray, easy-to-machine structure that reduces machine shop costs.

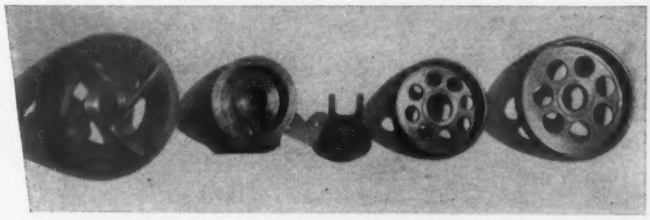


Use of 1% Nisiloy in these cylinder castings eliminated machining troubles from hard spots in light sections, raised output, reduced rejects and cut final costs.

• HOW TO USE IT

"NISILOY" is simply added to the ladle. Additions of from .25 per cent to 1.00 per cent usually prove sufficient for structure control. Improve quality and quantity of your output. Get full information . . . mail the coupon now.

*Trade Mark of The International Nickel Company, Inc.



Nisiloy helps you control properties of gray iron for casting parts with varied cross sections that tend to create chilled surface areas. Its use eliminated machining troubles, and provided a dense, uniform close-grained microstructure in these bonnets, slide valves and bushing.

EMBLEM OF INCO SERVICE
TRADE MARK

At the present time, the bulk of the nickel produced is being diverted to defense. Through application to the appropriate authorities, nickel is obtainable for the production of engineering alloys for many end uses in defense and defense-supporting industries.

THE INTERNATIONAL NICKEL COMPANY, INC.
Dept. 20, 67 Wall Street, New York 5, N. Y.

Please send me your booklet entitled, "NISILOY" for GRAY IRON CASTINGS.

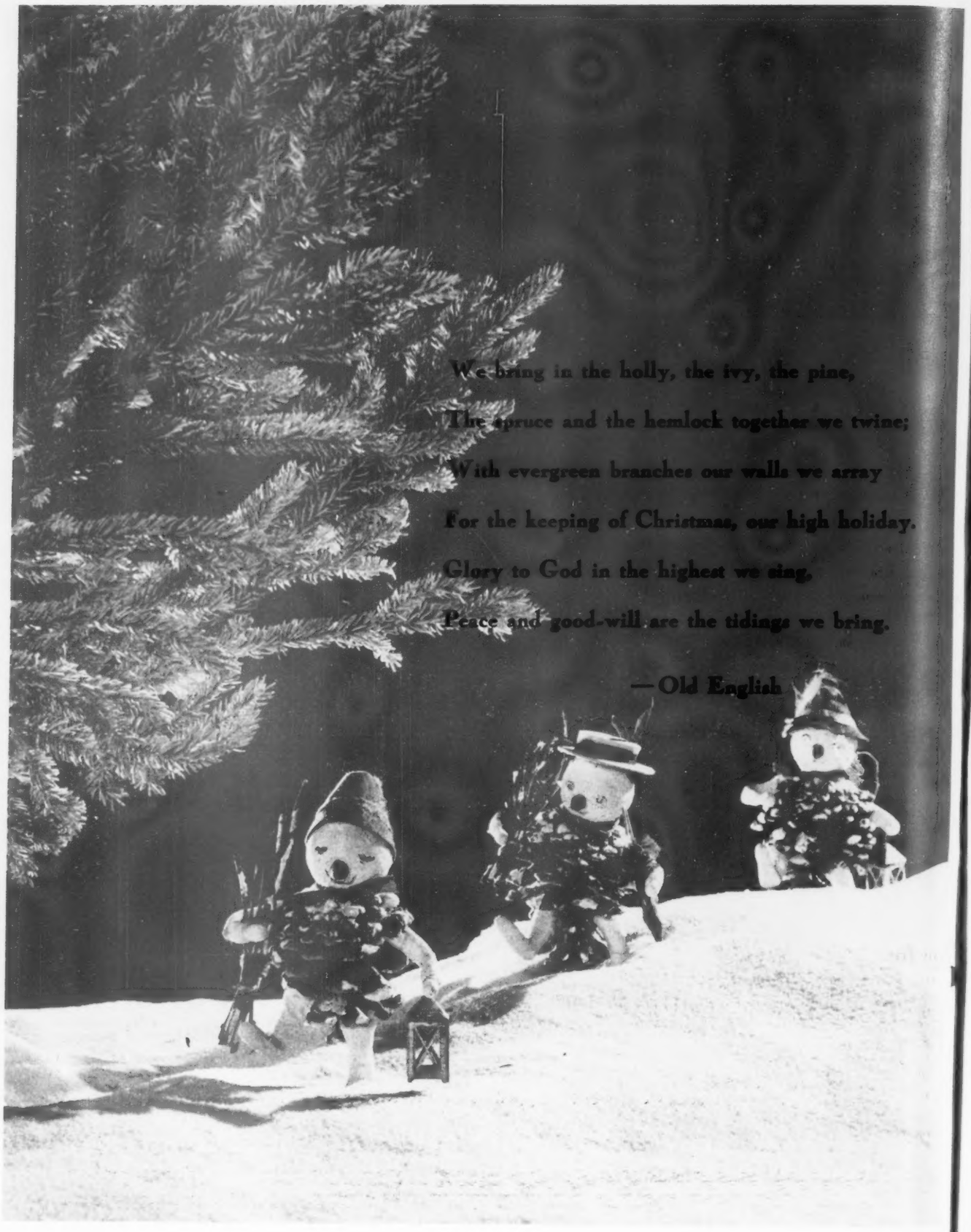
Name.....*Title*.....

Company.....

Address.....

City.....*State*.....

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N. Y.


We bring in the holly, the ivy, the pine,
The spruce and the hemlock together we twine;
With evergreen branches our walls we array
For the keeping of Christmas, our high holiday.
Glory to God in the highest we sing,
Peace and good-will are the tidings we bring.
—Old English

FEDERAL

Holiday Greetings...

THE FEDERAL FOUNDRY SUPPLY COMPANY • CLEVELAND, OHIO

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

DECEMBER 1952

FOUNDRY

Volume 80—Number 12

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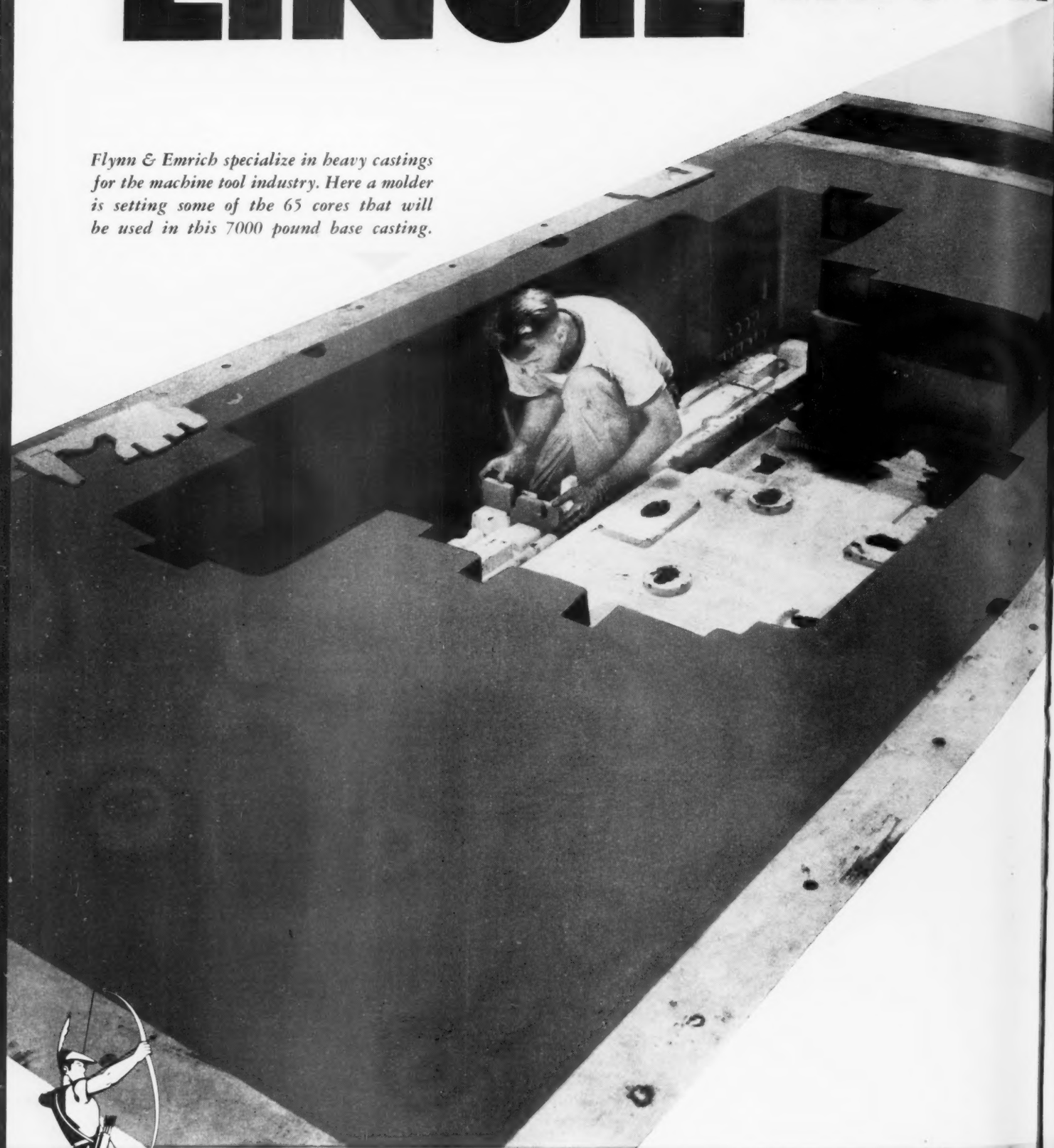
THE COVER: The original painting of this foundry scene hangs in the offices of Lebanon Steel Foundry, Lebanon, Pa. See page 10

UNIFORM

LINOIL HELPS SET

Flynn & Emrich specialize in heavy castings for the machine tool industry. Here a molder is setting some of the 65 cores that will be used in this 7000 pound base casting.



ARCHER • DANIELS • MIDLAND COMPANY

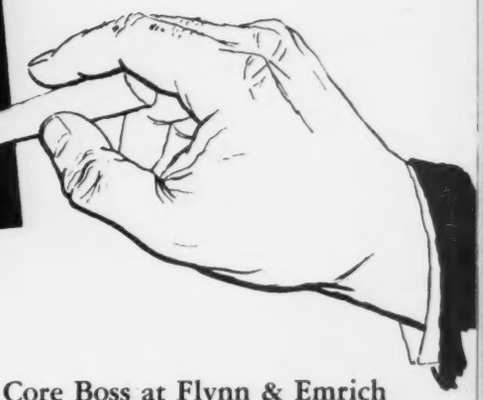
FOUNDRY PRODUCTS DIVISION • 2191 WEST 110TH STREET • CLEVELAND 2, OHIO

NO-SCRAP RECORD!

FLYNN & EMRICH CO.

SCRAP FROM CORE FAILURES

1947	1948	1949	1950	1951
0	0	0	0	0



Charlie Runk, Core Boss at Flynn & Emrich Company's foundry in Baltimore, is justly proud of the record of his core room. Weekly scrap report sheets show *no casting losses charged to the core room during the past five years.*

F & E's core room is a carefully operated department. There's no guess-work. Dry ingredients are weighed before being added to the muller. A plant-designed-and-built metering system delivers exact amounts of water and LINOIL. Oven temperatures are watched closely. Constant supervision on every operation eliminates any chance errors.

The reason Flynn & Emrich use LINOIL is simple. They consider LINOIL one of their constant factors in a varied jobbing production. They know that cores will be strong and thoroughly baked. They feel they can count on good cores today, tomorrow, and every day . . . and they can. Look at the record.

If you're not presently a LINOIL user, ask your LINOIL man for a demonstration next time he calls.

Cores of all sizes and shapes are baked together. LINOIL insures a thorough bake in the largest cores —no overbaking in the smallest.

FREE BOOKLET

A new booklet, "Facts about the LINOIL 700 Series" is available on request.

NEW PANGBORN BLAST

NON-FERROUS

. . . Blastmaster was selected by Duro Metal Products Co., Chicago, Illinois, for cleaning non-ferrous castings.

BRONZE

. . . National Bearing Div. of American Brake Shoe Co., Portsmouth, Va., has chosen the Blastmaster to clean bronze castings.

FORGINGS

. . . Huron Forge & Machine Co., Detroit, Mich., has purchased the Blastmaster for cleaning forgings.

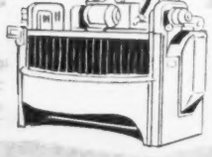
STEEL SCALE

. . . Mathews Heat Treating Co., Newark, N. J., is one of the companies that have picked the Blastmaster for removing steel scale.

GRAY IRON

. . . Typical of foundries that have bought the Blastmaster to clean gray iron is the Gisholt Machine Co., Madison, Wis.

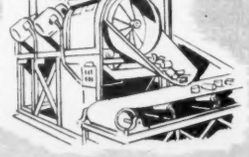
PANGBORN HAS EVERYTHING YOU NEED IN BLAST CLEANING & DUST CONTROL EQUIPMENT



Pangborn ROTOBLAST Tables for semi-continuous blast cleaning. Types and sizes for castings of all sizes and shapes.

Pangborn ROTOBLAST Table-Rooms for general-purpose blast cleaning. An extremely efficient machine for jobbing foundries.

Pangborn Hydro-Sand Blast Rooms for simultaneous blast cleaning and core-removal.



Pangborn "Continuous-Flo" ROTO-BLAST Barrels for cleaning a steady flow of miscellaneous work at high rate of production.

Pangborn Dust Control equipment for every purpose traps dust at the source, saving money and improving work conditions.

MASTER BARREL

. . . cleans wide variety of materials

FASTER—CHEAPER—BETTER!

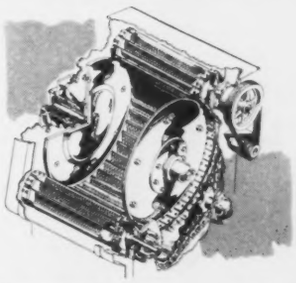
Read over the wide variety of materials that Pangborn's new Blastmaster ROTOBLAST® Barrel cleans—and the firms that have bought the barrel. Then think of how this versatile machine can help you get more efficient, more rapid, and more economical blast cleaning in *your* shop! Remember—the Blastmaster features famous Pangborn ROTOBLAST, that saves you money these five ways:

- **SAVES LABOR** with push-button operation
- **SAVES SPACE** because machines are compact
- **SAVES TIME** by cleaning more loads per day
- **SAVES POWER** since no compressor is needed
- **SAVES TOOLS** because all scale is removed

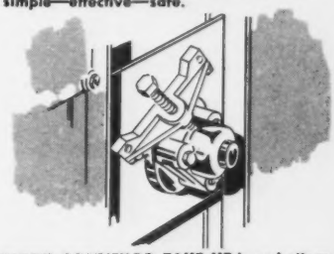
If you're interested in better, faster, cheaper blast cleaning, you owe it to yourself to find out more about the Pangborn Blastmaster Barrel. It's available in 4 sizes—3, 6, 12, and 18 cu. ft. capacity. For other equipment in the famous Pangborn line, see illustrations elsewhere in this ad. For more details, write for Bulletin No. 223 (Blastmaster Barrel) or No. 214 (all ROTOBLAST equipment). Address: PANGBORN CORP., 1400 Pangborn Blvd., Hagerstown, Maryland.

LOOK TO PANGBORN FOR THE LATEST DEVELOPMENTS IN BLAST CLEANING AND DUST CONTROL EQUIPMENT

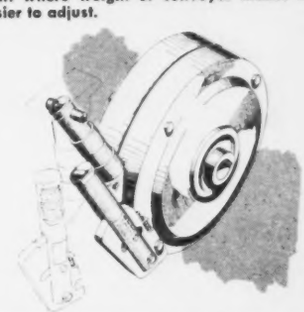
Note these exclusive BLASTMASTER construction features



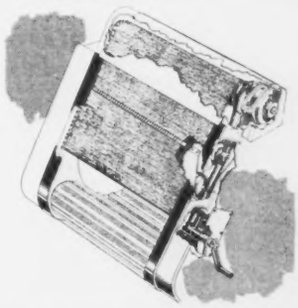
WORK CONVEYOR will not clog. Hardened steel chain with special metal slats designed so no aperture will pinch work. Drives through V-Belt to Spur Gear-Reducer mounted directly on work conveyor shaft—simple—effective—safe.



WORK CONVEYOR TAKE-UP is on bottom shaft where weight of conveyor makes it easier to adjust.



AUTOMATIC THROW-OUT TORQUE ARM protection disengages the barrel drive in case of jams. Works in both loading and unloading directions.



ABRASIVE-TIGHT DOOR. Woven wire mesh construction backed with vulcanized rubber. Rolls up compactly when door is opened. Slides on rollers in mechanized labyrinth. Always protected against abrasive action and tumbling castings by heavy rubber curtain.

OVER 28,000 PANGBORN MACHINES SERVING INDUSTRY

MEMBER FEMA

Pangborn

BLAST CLEANS CHEAPER

with the right equipment for every job

leading foundries

select

COLEMAN O

There is a Coleman Oven to help give you maximum production on every core baking or mold drying job —regardless of the size and shape of your castings. Coleman Ovens in leading foundries from coast-to-coast are proving vital in increasing casting tonnage at low cost...with less man power!

It will pay you to investigate how Coleman Ovens can solve your baking and drying problems. Our 50 years of engineering experience is available without obligation.

BAKING AND DRYING TIME REDUCED regardless of size and shape of cores and molds, increasing turnover of plates, dryers, and flask equipment.

MOST EFFICIENT HANDLING METHODS for your type of work and plant conditions...eliminate delays and losses.

PERFECT CORE BAKING ends manpower and casting losses due to make-overs and rejects.

PERFECT MOLD DRYING for true-to-pattern castings and easy cleaning.

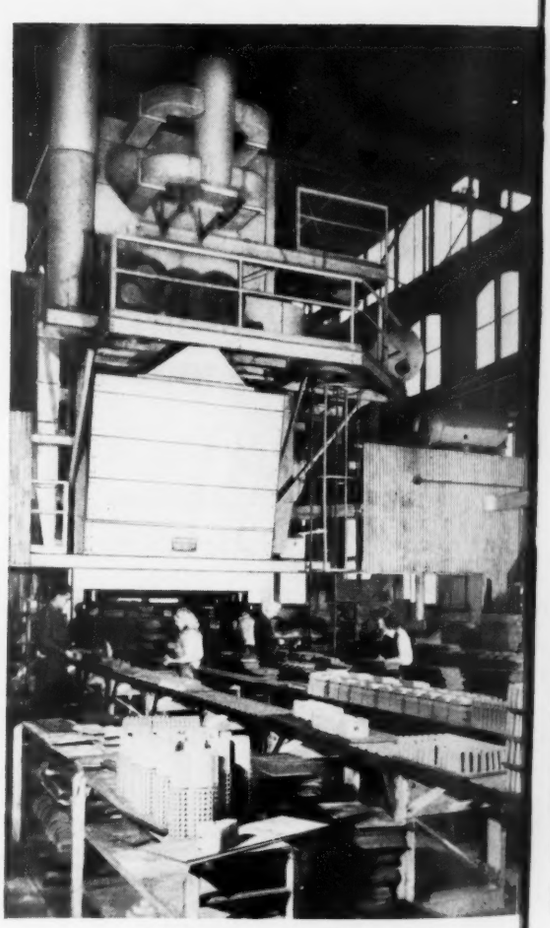
INCREASED PRODUCTION by making the most efficient use of skilled and unskilled labor.

HEAVY DUTY CONSTRUCTION for continuous dependable performance, economical operation, and minimum maintenance cost.

GREATEST SAVINGS IN FUEL by using the most economical fuel available.

SAVE BINDER. Proper core baking atmosphere and uniform temperature permit important savings in conventional binders.

USE HIGH SPEED CORE BINDERS. Coleman Ovens have uniform temperature and accurate control to handle temperature-sensitive resins and pre-baked oils.



COLEMAN TOWER® OVEN

Eastern Malleable Iron Company, Wilmington, Delaware

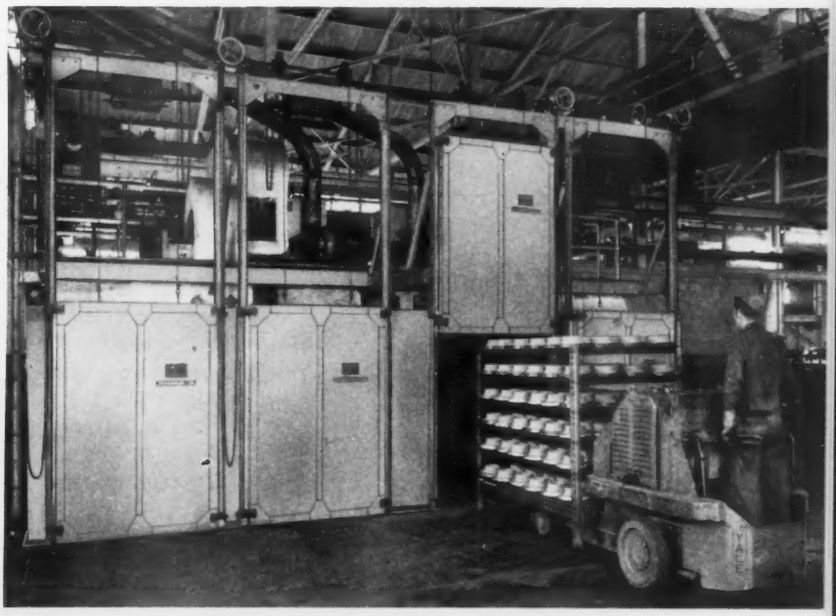
A COMPLETE RANGE OF TYPES:

COLEMAN OVENS are built in a complete range of sizes and capacities for every core baking and mold drying requirement: Tower Ovens, Horizontal Conveyor Ovens, Car-Type Ovens, Transrack Ovens, Rolling Drawer Ovens, Portable Core Ovens, Portable Mold Dryers, etc.

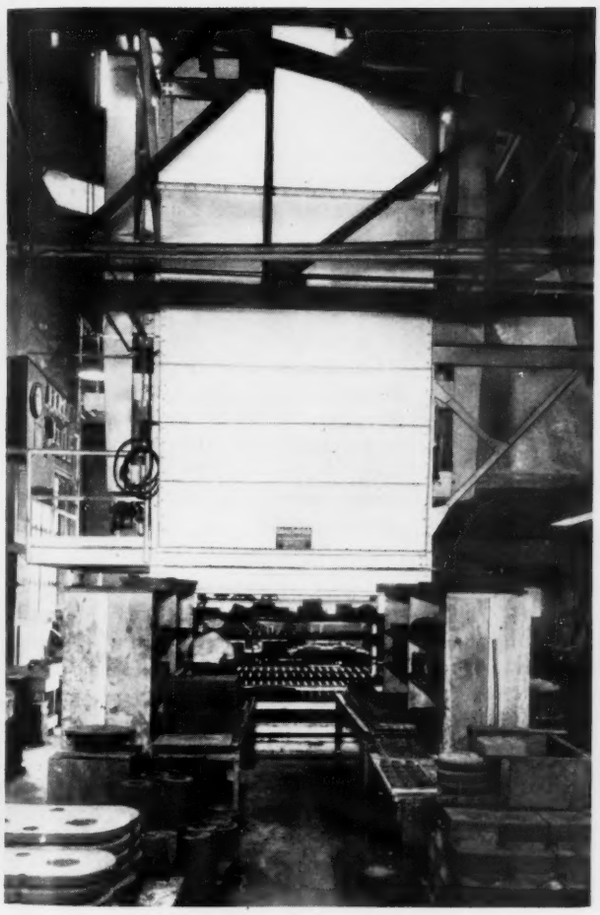
Write for Bulletin 48

from coast to coast

OVENS



COLEMAN TRANSRACK CORE OVENS
United States Pipe & Foundry Company, Decoto, California.



COLEMAN TOWER® OVEN
National Supply Company, Springfield, Ohio.

COLEMAN CAR-TYPE MOLD OVEN
The Bullard Company, Bridgeport, Connecticut.

THE FOUNDRY EQUIPMENT CO.

1831 COLUMBUS ROAD — CLEVELAND 13, OHIO

WORLD'S OLDEST AND LARGEST FOUNDRY OVEN SPECIALISTS

ENGINEERED BELTING CUTS COSTS 50%

■Ten years ago an Eastern foundry tried and discarded four different types of conveyor belting. Extremely hot core sand made replacements frequent and expensive. An Imperial Belting engineer analyzed the operating conditions and recommended Imperial's INSULATED SAHARA, a belting manufactured especially for carrying hot, abrasive materials. Insulated SAHARA outlasted all belts previously tried by **2 to 1.** Since 1939 no other brand of belting has been used.

Unexcelled for Hot Materials

Made of 37½ ounce tight woven duck combined with asbestos and special insulating material and then impregnated. Insulated Sahara handles materials from 300° F. to 450° F.; Super-Insulated Sahara, from 450° F. to 600° F. Imperial's double-stitched, Inner-Locked construction positively prevents ply separation.

Write for Data Sheet 47-8 and prices.

IMPERIAL BELTING CO.

1755 S. Kilbourn Ave., Chicago 23, Ill.

Imperial
INNER-LOCKED
BELTING
Engineered Belting—
The Right Belt for Each Job

With the EDITORS

COVER: The excellent painting of a foundry scene, reproduced in four colors on the cover of this issue, is presented through the kind cooperation of Lebanon Steel Foundry, Lebanon, Pa., and John L. Worrilow, assistant to the president. The original painting was presented to William H. Worrilow, president of Lebanon Steel Foundry, by the employees of the company. The presentation was made on Dec. 11, 1951, and commemorated the 40th anniversary of the founding of the organization. At the same time the employees presented a painting entitled "The Big Floor" to Thomas S. Quinn, treasurer and general manager of the company. The artist was Aaron Bohrod.

—o—

For Excellence: For a number of years our editors and artists have devoted much time and thought to providing attractive layouts for our editorial articles. While many FOUNDRY readers have noted the results of these efforts and have taken the time to comment kindly and favorably, I am now pleased to report that the American Institute of Graphic Arts also has recognized this phase of our editorial presentation. An editorial spread from FOUNDRY (pages 100-101, February, 1952 issue) was displayed at the Third Annual Magazine Show staged in New York by that organization in October. The show is "directed toward raising the professional standards of layout, design and production of magazines." As a result of this display, the Penton Publishing Co. and Art Director Don Cadot both have been awarded Certificates of Excellence by the American Institute of Graphic Arts "for contributing to the publication of an outstanding magazine, FOUNDRY."

—o—

We Know the Boss: One evening a few weeks ago I happened to turn to the television program "Meet the Boss." The presentation was most interesting. The heads of three progressive companies were interviewed on the development and operation of their respective organizations. The third "Boss" was our own Bill Grede, president of Grede Foundries Inc., Milwaukee. To give atmosphere for this particular interview, films were shown depicting the making and pouring of molds in one of the Grede foundries. Bill also answered a number of questions on the production and use of steel and gray iron castings. All in all, it was good publicity for the foundry industry as well as for Grede Foundries' Inc.

—o—

A New Parlor Game: And speaking of publicity for the industry, it would seem that some TV editors on metropolitan dailies are aware of the possibilities of that medium for our industry. Recently, Robert H. Herrick, in a column "On the Air" appearing in the *Cleveland Plain Dealer*, pointed to the possibilities of using "the fires of industry" as excellent material for television presentation. He stated "The day-to-day business of running a foundry or die shop or fabricating center may seem like old stuff to the men on the job, but it could spell interest and fascination to the office-tied or home shackled Clevelanders whose only knowledge of such things is the smoke drifting from industrial chimneys." While we know that the film by the Malleable Founders' Society and those taken in a number of other foundries have been shown on TV, the field still seems wide open for a real public relations job.

—o—

More Conventionites: Yes, the editors have been out in the field covering meetings and pursuing editorial material. As a result of this activity, some difficulty is being encountered in finding space for all meeting reports. If your favorite meeting did not show in December, just be patient. It may be presented in January. In October and early November, editors attended the following meetings: Malleable Founders' Society Supervisory Development Conference in Cleveland; Gray Iron Founders' Society annual meeting in Cleveland; Foundry Equipment Manufacturers' Association annual meeting at the Greenbrier; Michigan Regional Conference at Ann Arbor; Metal Show at Philadelphia; New England Regional Foundry Conference at MIT; Metals Casting Conference at Purdue; Steel Founders'

(*Concluded on page* 12)

in one foundry
— cost records show...

HARBISON-WALKER

KUPLOMIX

saves 53%

IN CUPOLA LINING MAINTENANCE

The economical material for the construction and maintenance of joint-free linings

H-W KUPLOMIX is a high grade mixture of grain-sized silica (quartzite) and refractory bonding clay. It is shipped in moisture-proof sacks of 100 pounds net weight, or in bulk, ready for immediate use by mixing with water.

H-W KUPLOMIX is easily applied by means of air placement guns or by ramming. It provides durable joint-free linings at highly economical material and installation costs.

HARBISON-WALKER REFRACTORIES COMPANY
AND SUBSIDIARIES
World's Largest Producer of Refractories
General Offices: Pittsburgh 22, Pa.

At a gray iron foundry, cupola lining costs were compiled both on the basis of maintenance with fire brick and the usual patching material—and on the basis of using H-W KUPLOMIX. A comparison of these figures shows an annual savings of 53% in overall maintenance cost by the H-W KUPLOMIX method!

The excellent service rendered by H-W KUPLOMIX is attributable to its outstanding physical and chemical properties.

- H-W KUPLOMIX has the high refractoriness and the chemical composition necessary to withstand the corrosive action of cupola slags.
- In service H-W KUPLOMIX becomes dense and exceedingly impervious to penetration by destructive slags.
- At cupola operating temperatures, H-W KUPLOMIX develops good strength, making it resistant to impact when charging and to erosion by molten metal and slag.

The nearest Harbison-Walker representative will gladly give you full information about this outstanding cupola lining material.

He's making a "ROUGH" suggestion for better production grinding

SIMONDS ABRASIVE CO.

Grinding Wheels

Simonds Abrasive Company Snagging wheels for heavy production grinding! That's the suggestion. It's a worthwhile one for *your* grinders, too . . . swing frame, floor stand or portable. These wheels are plenty rugged, with smooth hard sides that hold up on corners without impairing cutting action.

Perhaps *your* jobs don't involve snagging. No matter! If they call for grinding wheels, call on your Simonds distributor. He has the wheels you need for grinding, shaping, finishing and sharpening . . . grinding wheels, mounted wheels and points, segments, abrasive grain . . . products proving their worth in every phase of industrial grinding.

Write for name of your Simonds distributor, and free data book.

SIMONDS ABRASIVE CO., PHILADELPHIA 37, PA. BRANCH WAREHOUSES: CHICAGO, DETROIT, BOSTON
DISTRIBUTORS IN PRINCIPAL CITIES

Division of Simonds Saw and Steel Co., Fitchburg, Mass. Other Simonds Companies: Simonds Steel Mills, Lockport, N. Y. Simonds Canada Saw Co., Ltd., Montreal, Que. and Simonds Canada Abrasive Co., Ltd., Arvida, Que.

(*Concluded from page* 10)

Society annual T & O meeting at Cleveland; All-Canadian Foundry Conference at Montreal and the Southwestern Regional Foundry Conference at Dallas.

—o—

Back Yard Foundry: M. R. Husted, Husted Foundry & Machine Shop, Sultan, Wash., has sent in the accompanying illustration of his first foundry in the backyard of his home. The cupola was a 32-gal can with a Ford flywheel for a bottom. In this cupola he has melted 600-lb heats for castings, including those required for his 30-in. cupola. Mr. Husted has been a foundryman for 60 years and reports he loves the work. Pat Dwyer wonders if the figure in the foreground is a transmogrified customer, apprentice, hobo molder, or a nosey bus tourist from the East.

—o—

Castings on Display: A visit to the Metal Show held recently in Philadelphia under ASM auspices revealed the interesting fact that the total number of companies displaying castings exceeded those showing any other type of engineering material or component. This is just another indication of the ever increasing emphasis on merchandising of castings.

—o—

An Excellent Job: And when it comes to merchandising castings, I want to add a word of praise for the excellent pamphlet on "Malleable Iron" recently published by the Albion Malleable Iron Co., Albion, Mich. The text has been well prepared to tell the engineer "about malleable iron—its properties and characteristics." The industry, as well as the company, will benefit from this fine discussion. F.G.S.

How to handle the "HOT ONES" and get longer conveyor belt life

NEW SAND
TEMPERED SAND
RETURN SAND
OILY CORE SAND
CASTINGS
SCRAP METAL
BAKED CORES
FLASKS

YOU know how most foundries are "belt eaters" when it comes to conveyor belting. Temperatures handled vary from cold to red hot materials; belts may be damaged by sharp metal. As a result, belt life in foundries can be measured in anything from days to years.

Meeting the specific on-the-job requirements for each conveyor in your plant calls for the G.T.M.—Goodyear Technical Man. For he knows conveyor belts best—and can specify a belt for each installation that matches its specific requirements to give you longest, most trouble-free service at lowest over-all cost. You can reach the G.T.M. for a discussion of your specific problems by writing Goodyear, Mechanical Goods Division, Akron 16, Ohio.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS
GTM-Specified CONVEYOR BELT
CONSTRUCTIONS for USE IN FOUNDRIES

STYLE HT—moderate temperatures—150°-250°—and average abrasion

STYLE 6740—temperatures over 250°

GLASS FABRIC CONVEYOR—temperatures over 300°

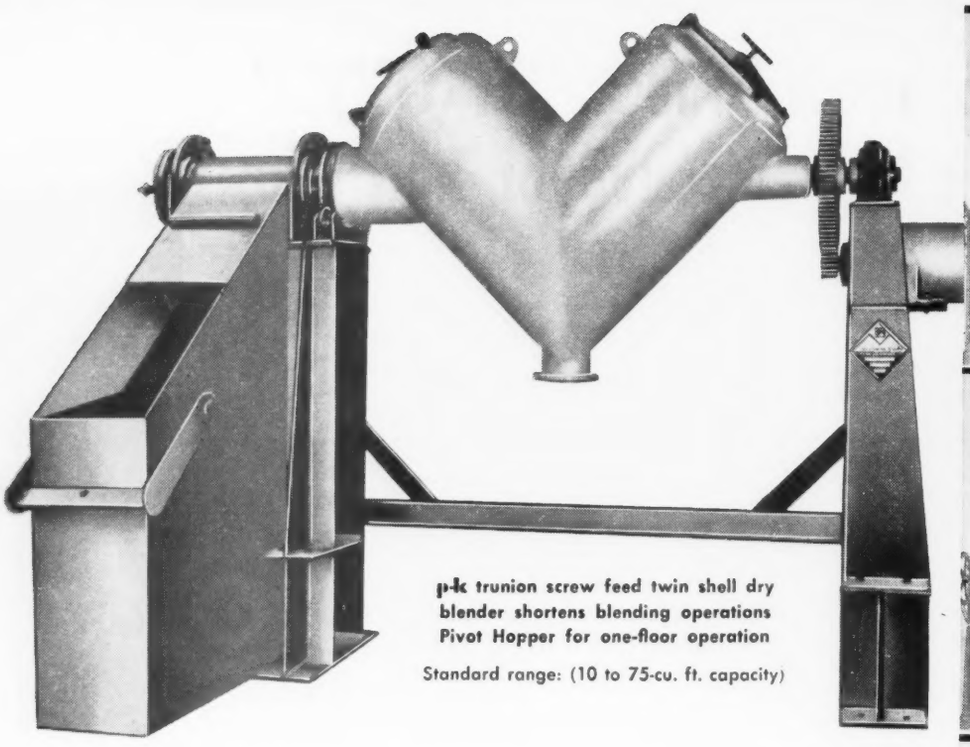
STYLE B } —where abrasion is greater problem
STACKER } than heat resistance

WIRE INSERTED BELTS—where accidental ripping is problem

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Molded Goods, Packing, Tank Lining, Rubber-Covered Rolls. He's listed in the yellow pages of your telephone directory under "Rubber Products" or "Rubber Goods." Or write Goodyear, Mechanical Goods Division, Akron 16, Ohio.*

GOODYEAR

THE GREATEST NAME IN RUBBER

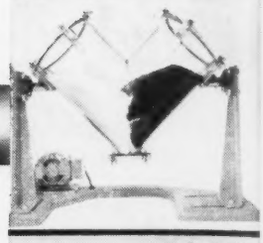


p-k trunion screw feed twin shell dry blender shortens blending operations Pivot Hopper for one-floor operation

Standard range: (10 to 75-cu. ft. capacity)

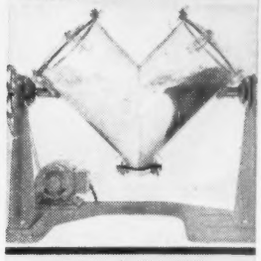
LOAD

As this typical test illustrates, the effectiveness of this new blending principle assures a thorough blend in minutes.



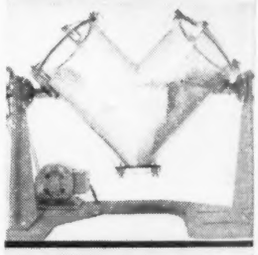
1st REV.

The gentle rolling, folding, dividing and combining action with a simultaneous cross flow can be seen in the first revolution.



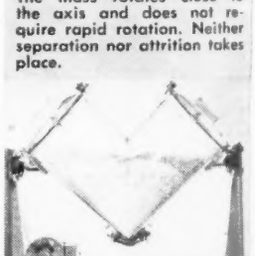
5th REV.

End-to-end dispersion and intimate mixing becomes evident. This is true regardless of particle size, form or density.



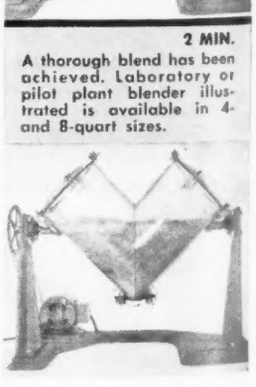
1 MIN.

The mass rotates close to the axis and does not require rapid rotation. Neither separation nor attrition takes place.

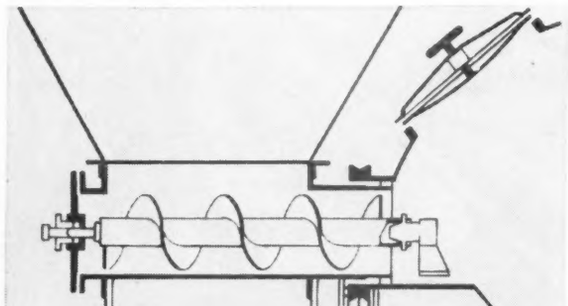


2 MIN.

A thorough blend has been achieved. Laboratory or pilot plant blender illustrated is available in 4- and 8-quart sizes.



Now! Dry blending is even faster



p-k trunion screw feed fixed hopper for conveyor or through-floor operation

Standard range: (10 to 150-cu. ft. capacity)

The new **p-k** trunion-feed, twin shell dry blender is faster because: Hopper can be loaded while blending is in progress permitting semi-continuous operation which speeds up the overall blending process. The blender is loaded directly from the hopper by a short, screw conveyor in a fraction of the time formerly required. All internal surfaces — shell, hopper and screw are quickly accessible for cleaning.

Gentle rolling-folding action assures rapid blending of sands and resins vital to the shell molding process, thoroughly and without attrition.

Simply designed for better blending.

Dust tight loading ports eliminate dusting which results in a clean operation. All interior surfaces are baffle-free and are easily reached for thorough cleaning.

When your process planning includes a blending operation, it will pay you to ask **p-k** for blending tests on your materials and for engineering assistance at the initial planning stage. Since **p-k** also makes double-cone and ribbon blenders, an unbiased analysis of your blending methods is assured. Or, write for factual literature—Catalog No. 12. ⊕1901-P

the **Patterson-Kelley Co.,** *Inc.*

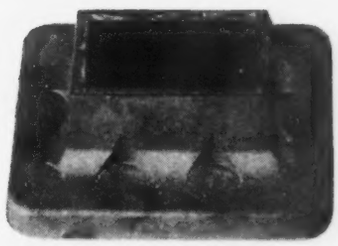
1420 Lackawanna Ave., East Stroudsburg, Penna.

101 Park Avenue, New York 17 • Railway Exchange Building, Chicago 4 • 1700 Walnut Street, Philadelphia 3 • 96-A Huntington Avenue, Boston 16 • and other principal cities

Shell mold and bronze casting
by Walworth Co., New York 17, N. Y.

SHELL MOLDING

And Mass Production



The foundry that is frequently called upon to produce large runs of identical castings should investigate the shell molding process. This improved casting technique is particularly effective for thin-wall sections and for parts requiring sharp detail. The lightweight shell molds, made of fine-grained sands bonded with BAKELITE Phenolic Resins, yield ferrous and non-ferrous castings that are almost pattern-smooth. Here are some advantages:

For Foundries:

- Molds are light in weight, are easily handled and moved about.
- Molds can be stored until needed without deteriorating.
- Ninety to ninety-five per cent less sand is used.
- More good castings are yielded per ton of metal poured.
- Laborious surface finishing of castings is reduced.

For Users of Castings:

- Castings have almost pattern-smooth surfaces.
- Pieces are cast to closer finished dimensions—tolerances as close as .003 to .005 inches per inch.
- Higher percentage of sound, uniform castings means fewer rejects.
- Reduced machining operations result in lowered production costs.

BAKELITE
TRADE-MARK
PHENOLIC RESINS FOR SHELL MOLDING

TRADE MARK

BAKELITE COMPANY
A Division of
Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York 17, N. Y.
In Canada:
Bakelite Company (Canada) Ltd., Belleville, Ont.

Learn more about Shell Molding!
Send for this Free Booklet!

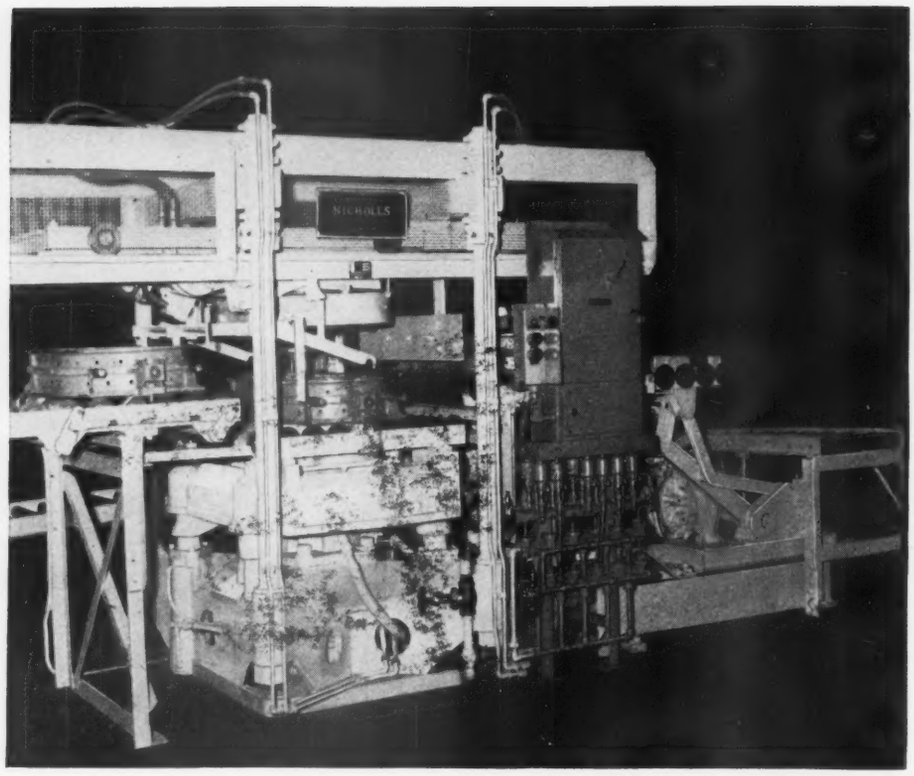
BAKELITE COMPANY, Dept. OM-29
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street, New York 17, N. Y.

Please mail my free copy of the Booklet C-8, "BAKELITE Phenolic Resins for the Shell Molding Process."

*Name*_____ *Title*_____

*Company*_____

*Street*_____ *City*_____ *Zone*____ *State*_____



No. 21 Type C. F.—Jolt, Squeeze and Pattern Draw — Automatic-Push Button Control

(Also Made in Smaller and Larger Sizes)

New "Push-Button" Operation Takes The Guesswork Out of Molding

From start to finished mold, the Nicholls #21 Type CF Jolt, Squeeze and Pattern Draw Molding Machine is push-button controlled to eliminate dangerous risks, costly mistakes—to give you better molds *continuously*. Precision built for long years of service . . . made with all the safety-devices, the hidden "quality points" that reduce maintenance costs . . . the know-how that almost half a century of building quality molding machines has made possible. If you're interested in better quality molds at lower cost—investigate these machines now.

For complete information, write to:

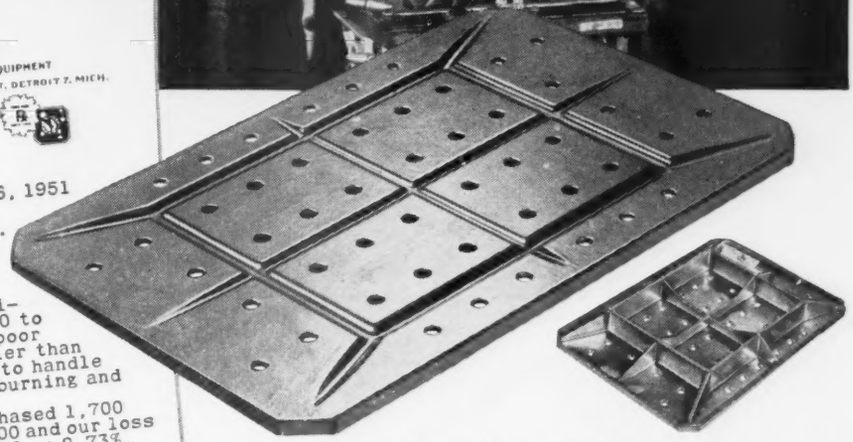
William H. Nicholls Co., Inc.

Richmond Hill 18, Long Island, New York

NICHOLLS

"EDCO Dowmetal BOTTOM BOARDS have resulted in tremendous savings for our foundry"

...says M. C. Crawford of RILEY STOKER CORPORATION



RILEY STOKER CORPORATION
FUEL BURNING AND STEAM GENERATING EQUIPMENT
101 WALKER STREET, DETROIT 7, MICH.

Christiansen Corporation
1515 North Kilpatrick Ave.
Chicago 51, Illinois

May 16, 1951

Attn: Mr. Edw. S. Christiansen, Pres.

Gentlemen:

Before the purchase of EDCO Dowmetal Bottom Boards, we made our own wood boards at a cost of approximately 70c each. We would make 5,000 to 6,000 per year and ended up with a poor quality board. They were much heavier than EDCO magnesium boards, not as easy to handle on the line, and our losses due to burning and breakage were 60 to 80% per year.

In three years time, we have purchased 1,700 of your boards at a cost of $7,585.00 and our loss in this period has been only $207.36 or 2.73%.

EDCO Dowmetal Bottom Boards have resulted in tremendous savings for our foundry. It is a pleasure to recommend them to other foundries.

Yours very truly,
RILEY STOKER CORPORATION
M. C. Crawford
M. C. Crawford
Director of Purchases
Detroit Plant

Above photo shows molder at Riley Stoker Corporation placing EDCO Bottom Board on flask preparatory to pressing. EDCO DOWMETAL magnesium boards maintain high quality of castings and reduce rejects because the exclusive grooved and vented design permits escape of gasses and insures mold stability.

Progressive foundry operators, like Riley Stoker Corporation, are equipping their foundries with EDCO DOWMETAL Bottom Boards.

Made of magnesium, these boards will not warp or break. There are no nails to come out, nothing to break or split—no upkeep! So durable, they can be considered permanent equipment. The many advantages from the use of these boards are effective immediately on their installation.

Write us or phone CApitol 7-2060 today for complete price schedule and list of 74 standard sizes available from stock.

Riley Stoker Corporation is one of the three largest manufacturers of steam generating and fuel burning equipment in the country. EDCO DOWMETAL Bottom Boards are used exclusively in their foundry in the production of gray iron and alloyed casting components.

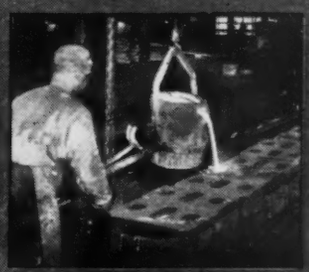
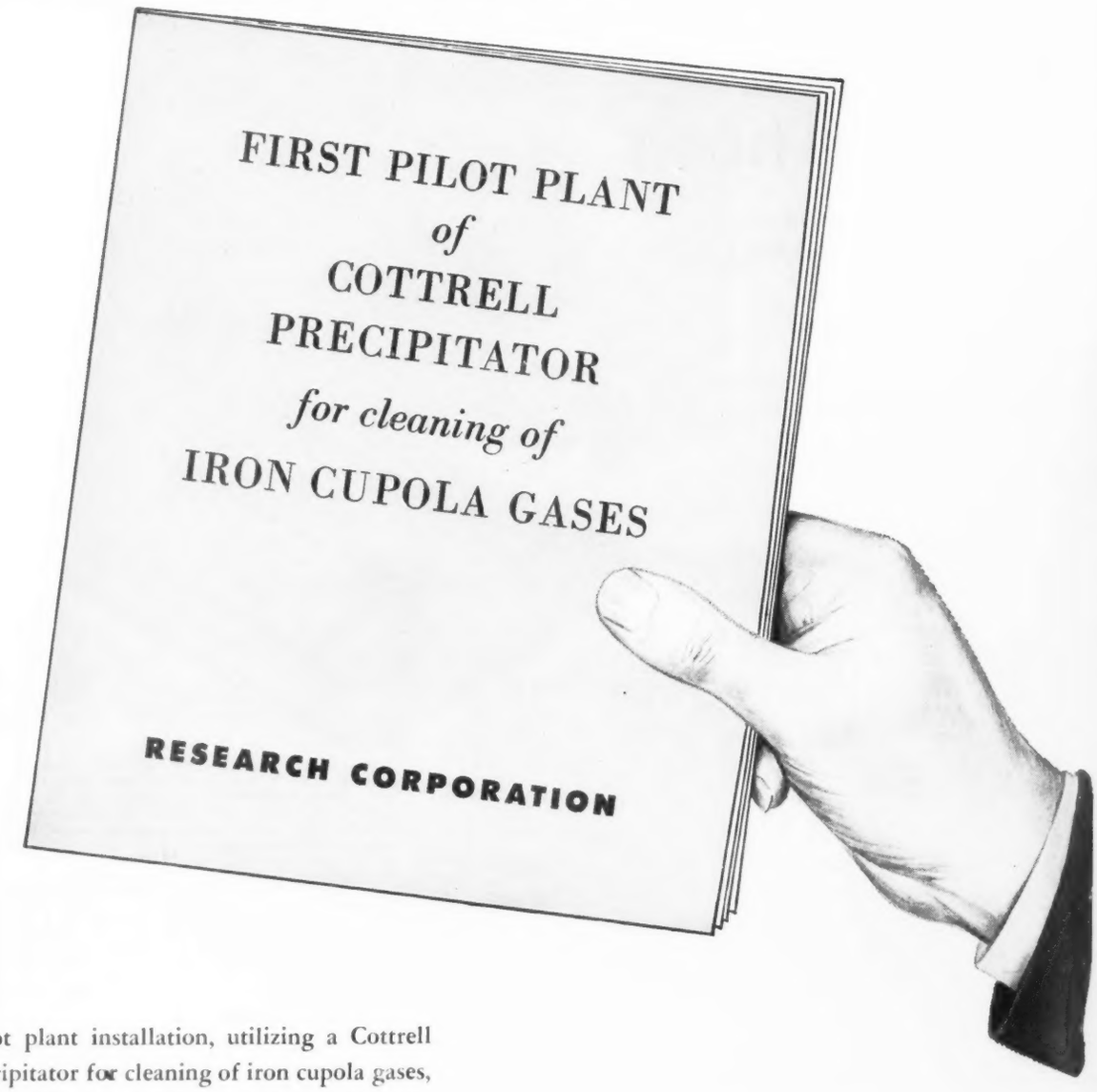


Photo at left shows molder pouring sand into flask. Photo at right shows molten metal being poured into molds which rest on EDCO Bottom Boards. Gravity conveyor line carries molds on for further processing.

EDCO CHRISTIANSEN CORPORATION

CHRISTIANSEN CORPORATION
1517 N. KILPATRICK AVE. • CHICAGO 51, ILLINOIS
ALUMINUM ALLOY INGOTS • ZINC BASE DIE CASTING ALLOYS

News on a New Process



The first pilot plant installation, utilizing a Cottrell Electrical Precipitator for cleaning of iron cupola gases, had resulted in detailed findings of industry-wide importance. On the basis of facts unearthed about cupola operation and the study of the design factors involved in this project, foundries have already placed orders for 15 precipitators with Research Corporation.

Ask your Research Corporation representative to go over the findings of this first pilot plant installation with you. His recommendation on your specific problem is based on 39 years of experience in the design and erection of over a thousand Cottrell Electrical Precipitators.

RESEARCH CORPORATION

405 Lexington Avenue
New York, New York

122 South Michigan Avenue
Chicago 3, Illinois

Bound Brook, New Jersey

RC-133

How TIMKEN® bearings keep a mixer from stirring up trouble

THE mulling action of this National Engineering Company No. 2 Simpson Mix-Muller is like the rubbing of a spoon on the side of a mixing bowl. It assures thorough distribution and diffusion of the mixing elements, eliminates balling of the material, provides a uniform product.

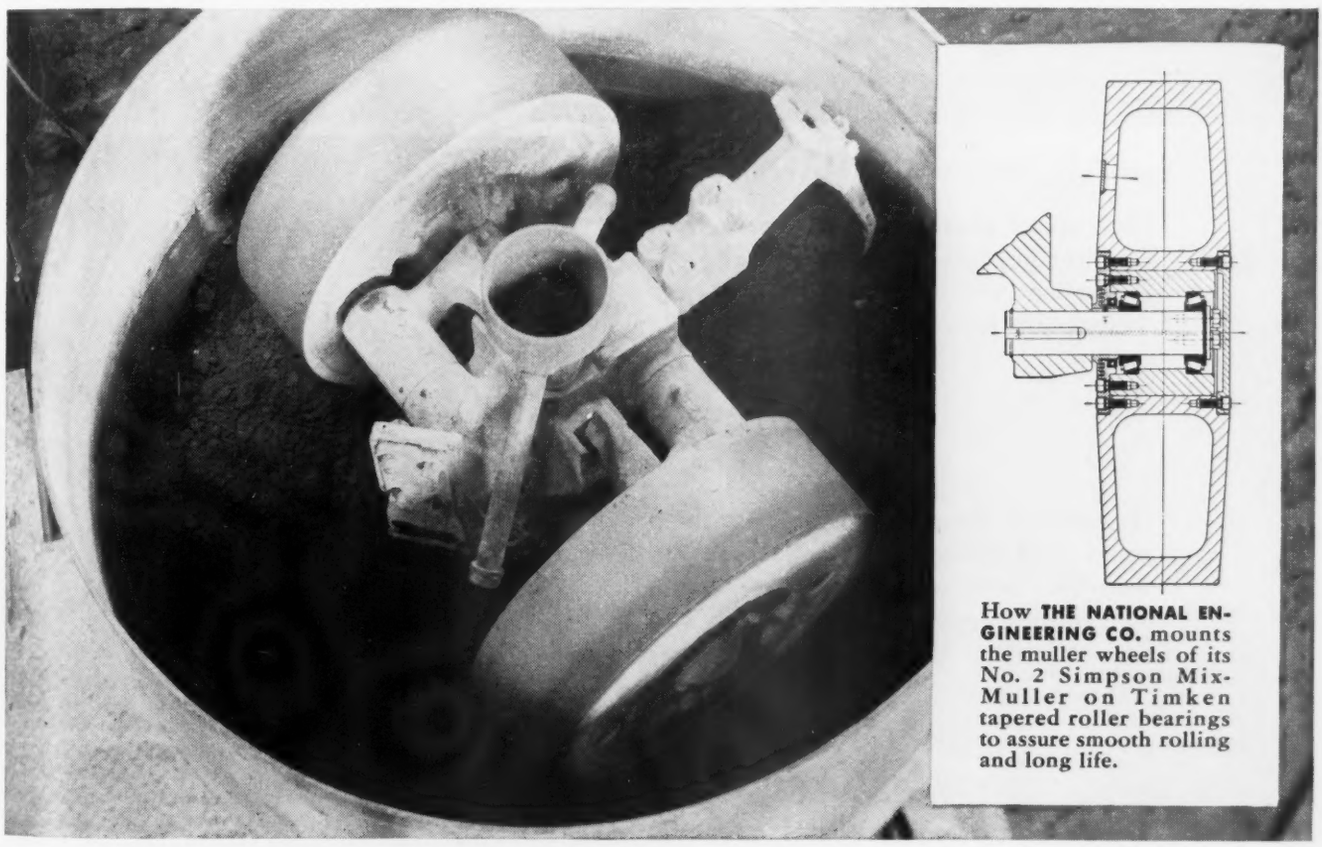
To keep the Mix-Muller running smoothly with less chance of breakdown, muller wheels, rocker arms, vertical post and speed reducer are mounted on Timken® tapered roller bearings.

With Timken bearings, loads are carried on a line of contact between rollers and races. There's extra load-carrying capacity. And tapered construction enables Timken bearings to take radial and thrust loads or any combination. Wheels and shafts are held in proper alignment. Gears mesh accurately. Wear on moving parts is reduced, longer life assured.

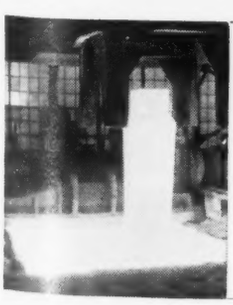
The true rolling motion and incredibly smooth surface finish of Timken bearings practically eliminate friction. And because Timken bearings keep housings and shafts concentric, closures are more effective. Dirt and mixing elements stay out; lubricant stays in. Lubrication and maintenance costs are cut.

No other bearing can offer you all the advantages of Timken bearings. Be sure to specify them for the machines you build or buy. Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED — *This symbol on a product means its bearings are the best.*



How **THE NATIONAL ENGINEERING CO.** mounts the muller wheels of its No. 2 Simpson Mix-Muller on Timken tapered roller bearings to assure smooth rolling and long life.



WE MAKE OUR OWN STEEL

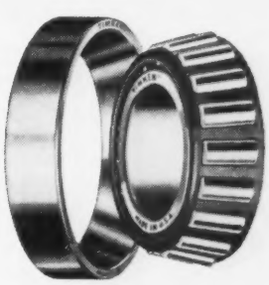
The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

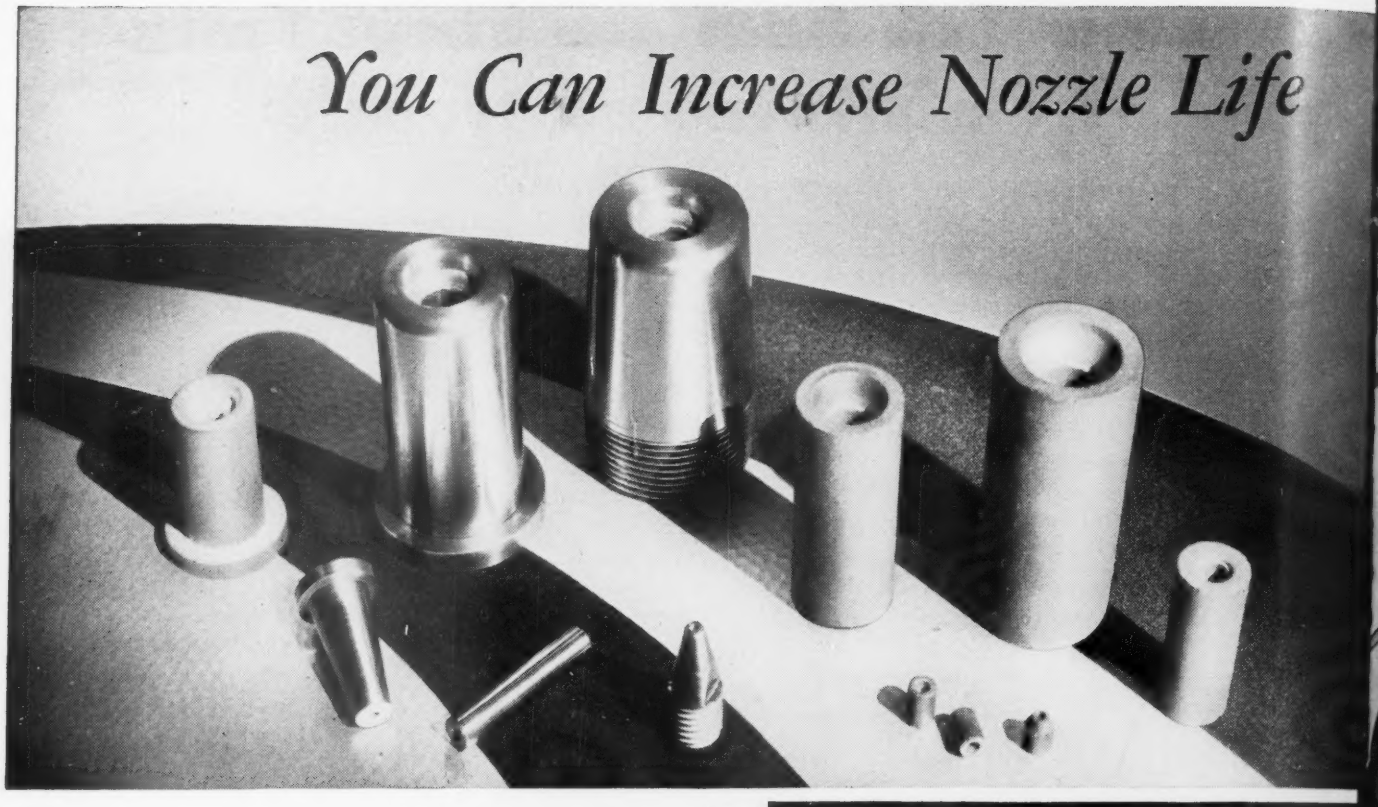
TRADE-MARK REG. U.S. PAT. OFF.

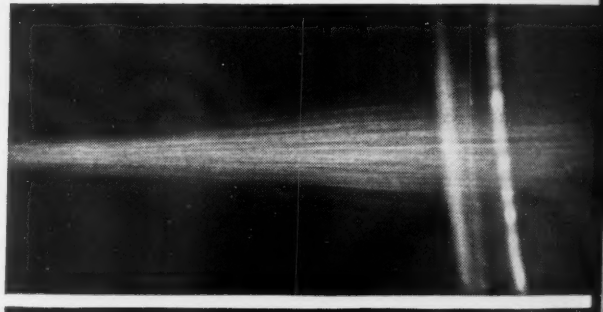
TAPERED ROLLER BEARINGS



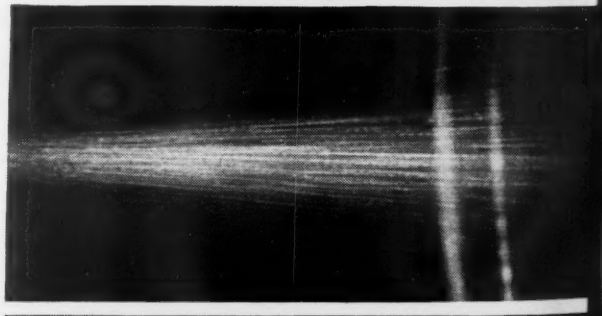
NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬭ AND THRUST ⬭ LOADS OR ANY COMBINATION

You Can Increase Nozzle Life

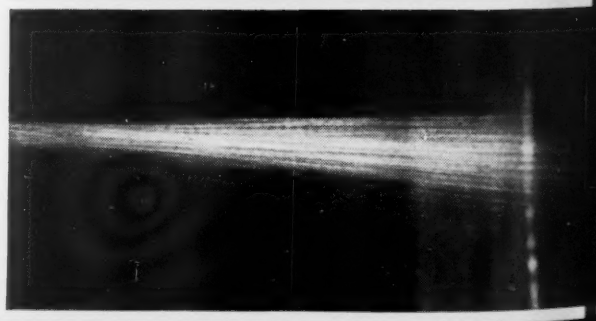




High speed photograph of stream from new iron nozzle — note that stream concentration and abrasive velocity and volume are fair.



Stream from the same nozzle after three hours with silica sand. Outlet opening worn to twice original size — stream concentration poor, abrasive velocity and volume low.



Stream from Norbide Nozzle after 404 hours with sand — outlet diameter worn only 0.032"—hundreds of hours of useful life remain—marked stream concentration—high abrasive velocity and volume.

NORTON WEAR-RESISTANT PRODUCTS NO

Every Time with NORBIDE Nozzles*

IF YOU ARE LOOKING FOR longer nozzle life and more service per dollar cost — then it will pay you to examine the performance of NORBIDE* Nozzles — the most wear-resistant nozzles ever made.

IF YOU WANT to decrease air consumption as much as 20% (over cast iron nozzles) —

IF YOU WANT to improve blast cleaning efficiency by using nozzles that maintain stream contour and abrasive velocity for a long period of service —

IF YOU WANT to do away with costly, time-consuming "down-time" brought about by short nozzle life —

THEN INQUIRE TODAY about long-lived NORBIDE Nozzles, made of Norton Boron Carbide — "the hardest material made by man". **Write for informative bulletin and price list No. 543-F.**

NORTON COMPANY, Worcester 6, Mass.

*Trade-mark Reg. U. S. Pat. Off.

NORTON COMPANY · WORCESTER 6, MASS. NORTON

900-lb. Core Baked Overnight

WITH TRULINE® AS THE BINDER

This is just one of many huge cores—some even heavier—baked thoroughly in one night by a large Eastern iron foundry, using Truline Binder in the mix. With former binders, baking took twice as long.

Iron foundries everywhere find that Truline not only cuts baking time up to 50%, but reduces new sand and binder costs. There's also less cleaning and chipping, because Truline-bonded cores collapse easily, shake out fast, reduce penetration and veins to a minimum.

Truline Binder can help *you* get more out of your baking ovens . . . save labor and materials . . . obtain cleaner, smoother castings. Our foundry service men will be glad to give you details.

Naval Stores Department

HERCULES POWDER COMPANY

INCORPORATED

920 King Street, Wilmington 99, Delaware

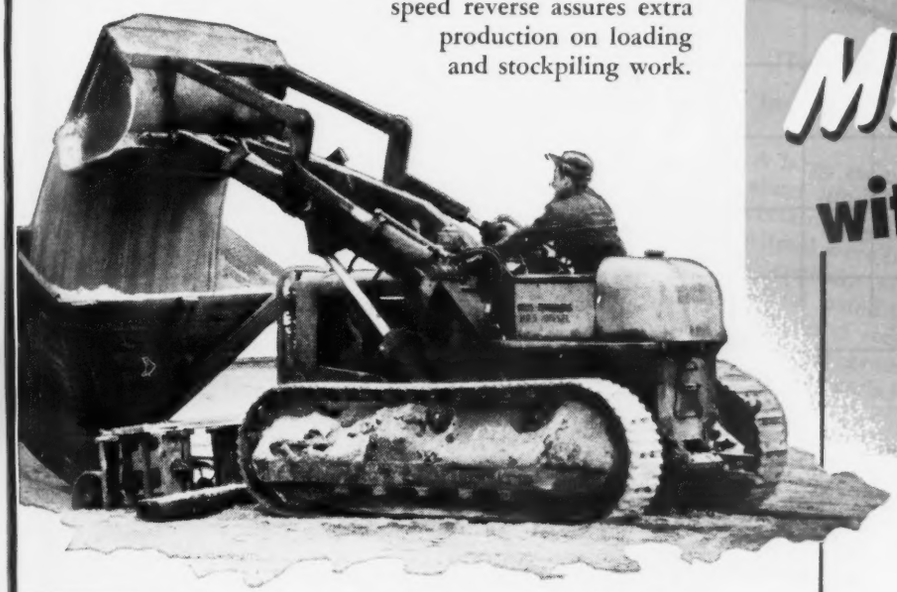
NF52-6

how to MOVE MORE MATERIALS with less manpower, less equipment

FOR HEAVY LIFTING, LOADING, TRANSPORTING—

Use the Allis-Chalmers Tracto-Shovel . . . Works Where Other Loaders Can't Operate

Use it for tough work in and around your plant . . . and on a variety of jobs, too. With quick-change attachments, the HD-5G becomes a fleet of machines in one . . . handles materials of all kinds — bulk, solid or packaged. Power, weight and traction enables this outfit to work in the toughest going. Exclusive 1000-hour lubrication of truck wheels saves 30 minutes greasing time a day. Two-speed reverse assures extra production on loading and stockpiling work.



ATTACHMENTS MAY BE INTERCHANGED IN ABOUT 20 MINUTES BY SIMPLY REMOVING 4 PINS

LIFT FORK skids, lifts and stacks packaged and palletized loads. Lifting height (under fork), 8 ft. 10 in.; capacity, 4,000 lb.

CHOICE OF FOUR BUCKETS Handle countless digging, loading, stockpiling and reclaiming jobs. Standard bucket, 1-yd. capacity. Also 2-yd. Light Materials Bucket, ¾-yd. Narrow Bucket and 1-yd. Rock Bucket.

CRANE HOOK for heavy-duty service. Lifts, carries and unloads. Capacity, 5,000 lb. Lifting height, 11 ft. 6 in.

OTHER ATTACHMENTS: Straight and Angledozer blades, Trench Hoe, Tine Fork, Rock Fork, Drag Bucket, Teeth for all buckets.

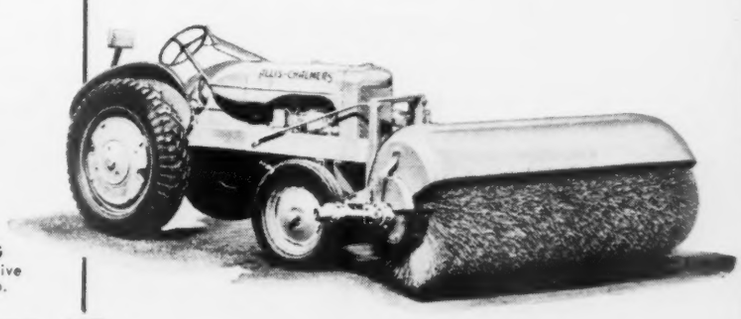
Now the same basic design . . . the same versatility that make the HD-5G Tracto-Shovel so useful is available on all four models of modern Allis-Chalmers Tractors.

1-yd. HD-5G	2-yd. HD-9G	3-yd. HD-15G	4-yd. HD-20G
40 drawbar hp.	72 drawbar hp.	109 drawbar hp.	Torque Converter Drive 175 net engine hp.

FOR HAULING AND SWEEPING—

Use the Allis-Chalmers IB

Built low, fast, powerful, the IB is the ideal industrial wheel tractor. It hauls trailers easily and safely up steep ramps, through narrow aisles, over railroad tracks and rough planking. Runs on less than a gallon of fuel an hour in average operation. Equipped with crane, the IB lifts, moves and spots loads up to 2,000 lb. With easily-attached sweeper, it removes snow, dirt or trash quickly.



ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

MANHATTAN

SNAGGING WHEELS

"The Wheels You Design"

In effect, your requirements design the Manhattan Snagging Wheels you buy. They are custom-tailored for your castings and grinding conditions. Hardness and composition, size and type of abrasive and the bond to be used are all specified after careful analysis of what you need. The result — you remove more metal faster at lower cost.

For swing frame grinders, stand grinders and portable grinders let Manhattan abrasive wheel engineers custom-tailor the right snagging wheels for the job.

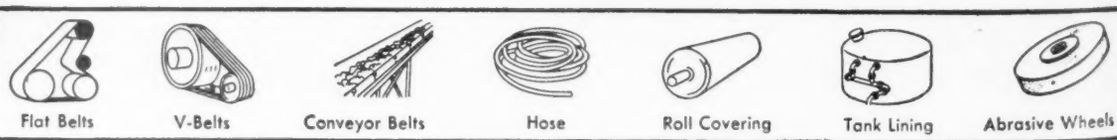
GRINDING WHEEL INSTITUTE MEMBER

WRITE TO ABRASIVE WHEEL DEPARTMENT

R/M

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Flat Belts · V-Belts · Conveyor Belts · Hose · Roll Covering · Tank Lining · Abrasive Wheels

Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks Clutch Facings • Asbestos Textiles • Sintered Metal Parts • Bowling Balls

MR-823

How B&W ALLMUL cuts severe service refractory costs

LEAD DROSS FURNACE

"ALLMUL proves more economical than any refractory tried!"

A plant with several reverberatory type smelting furnaces, used to melt alloys of lead, tin and antimony, carried on an extensive investigation to obtain economical refractory linings. Practically every type of refractory was tried. Side-by-side tests in the same furnace proved the economy of B&W Allmul over all others. Result? Allmul is now standard for these furnaces.

CONTINUOUS WELD PIPE FURNACE

"Three times the life in worst wear areas!"

A large manufacturer was troubled by the short life of kyanite-base refractories in certain areas of his furnace. Then B&W Allmul were installed in the uptake arches, a critical, severe-service area. Result? Allmul lasted three times as long as previously used refractories and has been ordered for general use in all areas of this manufacturer's furnaces of this type.

INDIRECT ARC FURNACE

"All furnaces converted to ALLMUL after comparative tests"

A large company making alloy steel castings has several indirect arc furnaces melting various alloys, with pouring temperatures varying from 2700F to 3100F. With highest temperature alloys, semi-mullite brick burned out in 6 to 10 heats. B&W Allmul, which cost approximately the same, showed no appreciable wear after 20 heats. On alloy steels in general, this customer reports far-less slag formation (an indication of reduced refractory wear) with Allmul than with any other refractory used. Result: All furnaces are being relined with B&W Allmul Firebrick.

ELECTRIC FURNACE ROOF

"ALLMUL lasts 3 to 6 times as long"

In a six-ton electric furnace, handling 15 tons of stainless steel per charge, super duty firebrick had to be replaced every 20 to 40 heats. Pouring temperature of the metal was in excess of 3100F, with higher temperatures attained in the furnace during periods of oxygen introduction. The owner installed B&W Allmul Firebrick, hoping for a life of 80 heats. Allmul in the first roof lasted for 122 heats—42 more than hoped for. The second roof of Allmul went to 131 heats! Result? Further orders for Allmul.

Yes, the facts about B&W Allmul Firebrick speak for themselves. This fused-mullite brick is proving its economy in dozens of severe service applications. The reason? A unique combination of refractory properties—high hot load strength, high resistance to spalling, good volume stability, a high melting point of 3335F—all resulting in lower furnace costs. Want more data? Write for Bulletin R-29.

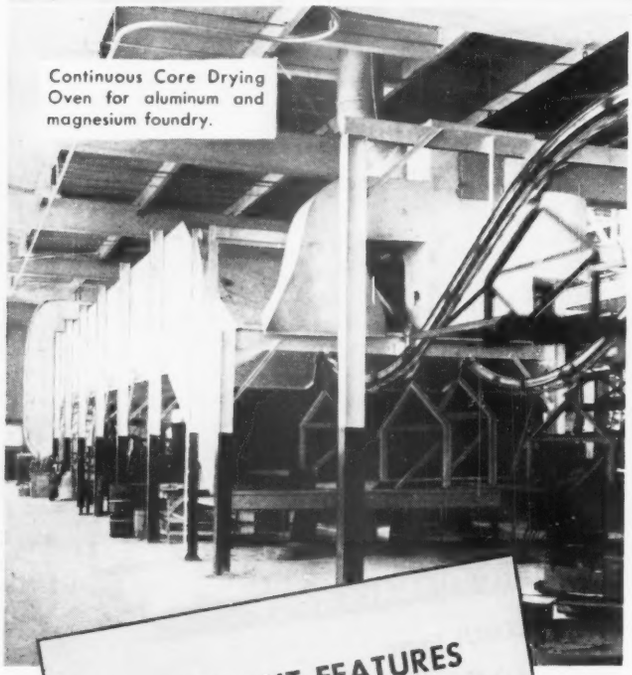
BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.

R-448

B&W REFRACTORIES PRODUCTS — B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick B&W Refractory Castables, Plastics and Mortars • OTHER B&W PRODUCTS—Stationary & Marine Boilers and Component Equipment . . . Chemical Recovery Units . . . Seamless & Welded Tubes . . . Pulverizers . . . Fuel Burning Equipment . . . Pressure Vessels . . . Alloy Castings

For Maximum Uniformity in core baking



Continuous Core Drying Oven for aluminum and magnesium foundry.

ROSS CORE OVENS

[Box or Batch Type Ovens for greater flexibility and maximum quality control.]

[Horizontal or Vertical Continuous Ovens for efficient handling of volume production.]

IMPORTANT FEATURES OF MODERN ROSS OVENS

The ROSS Heating and Circulation System that provides greater volume of air circulated to minimize temperature variation from one oven section to another.

ROSS specially designed nozzles that shorten the distance of air travel.

External heating equipment that saves floor space.

Steel insulated panel construction for easy assembly and change in location.

Full automatic control of time, cycle, speed and temperature.

EVERY foundryman knows that a casting is only as good as the core from which it is made. And the quality of a core is largely dependent upon the uniformity of its baking. ROSS Core Ovens are designed and built to provide maximum uniformity with accurately controlled heat to make sure that each core throughout the oven space, regardless of size or shape, is baked under the same conditions and within the same limits as every other core. The time, money and material saved with properly designed ROSS Ovens accounts for their popularity with efficient plants.

* * *

Take advantage of the knowledge and experience that ROSS can give you. A ROSS engineer will be glad to study your problems and help you select the type of equipment best suited for your individual requirements.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

MANUFACTURERS OF AIR PROCESSING SYSTEMS

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CARRIER-ROSS ENGINEERING COMPANY, LIMITED, LONDON, ENGLAND

REICHHOLD

Now Ready for You!

CHEMICALS

The New RCI Powdered Phenolic Resin for Making Shell Molds

● Only Reichhold's research and production facilities (international in scope), plus a close acquaintance with foundry practice make possible Foundrez 7500, the new RCI powdered phenolic resin for producing lower cost shell molds. A pioneer in the development of synthetic resins, Reichhold now offers the foundry industry the same realistic prices and up-to-the-minute technical service which have benefited RCI customers since the company founding. For complete details about Foundrez 7500 for shell molds, write

REICHHOLD CHEMICALS, INCORPORATED
630 Fifth Avenue, New York 20, New York

RCI

Creative Chemistry...Your Partner in Progress

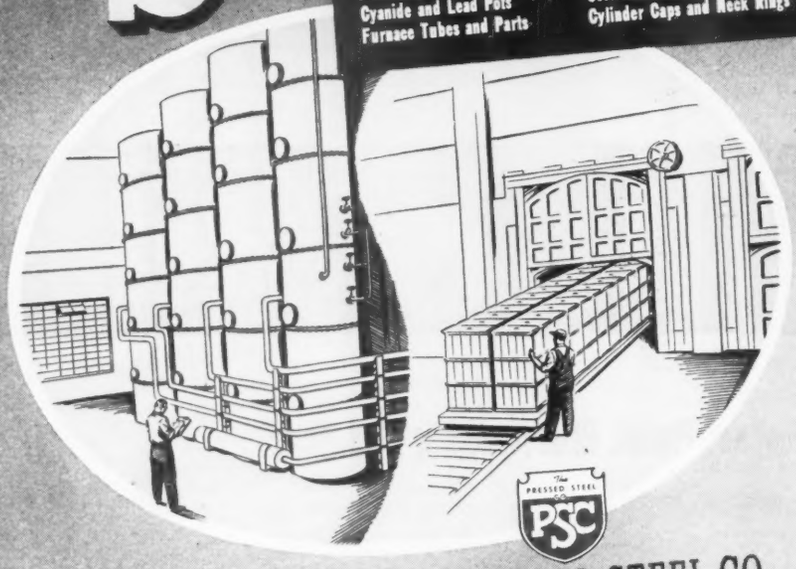
Plants: Detroit, Mich. • Brooklyn, N. Y. • Elizabeth, N. J. • South San Francisco and Azusa, Calif. • Tuscaloosa, Alabama • Seattle, Wash. • Chicago, Illinois Charlotte, N. C. • Jacksonville, Florida • Liverpool, England • Paris, France • Sydney, Australia • Hamburg, Germany • Naples, Italy • East London, South Africa Barcelona, Spain • Wiener, Austria • Buenos Aires, Argentina • São Paulo, Brazil • Sassenheim and Apeldoorn, Holland • Toronto, Port Moody, and Montreal, Canada • Osaka, Japan • Gothenburg, Sweden • Zurich, Switzerland

IF YOU USE SHEET ALLOY EQUIPMENT IN ANY OF THESE 30 CLASSIFICATIONS

PSC

Light-Weight
PROCESSING AND HEAT TREATING EQUIPMENT

Carburizing & Annealing Boxes
Trays - Fixtures - Retorts
Annealing Covers and Tubes
Cyanide and Lead Pots
Furnace Tubes and Parts
Bubble Caps, Alloy
Process Piping, Welded Alloy
Thermocouple Protection Tubes
Corrosion-Resistant Vessels
Cylinder Caps and Neck Rings



THE PRESSED STEEL CO.
WILKES-BARRE, PENNSYLVANIA

Size 8½"x11" to fit standard file

You will find the new PSC CATALOG helpful

CLASSIFICATIONS OF PSC HEAT AND CORROSION-RESISTANT INDUSTRIAL EQUIPMENT

Baskets, annealing & carburizing
Baskets, cyanide dipping
Baskets, pickling
Bends, alloy pipe & tubing (welding)
Boxes, annealing & carburizing
Caps, bubble (fractionating tower & still)
Caps, cylinder (compressed gas)
Covers, annealing (Bell furnace)
Covers, annealing (elevator furnace)
Fixtures, carburizing
Flights, conveyor (syn. rubber plant)
Headers, air pre-heating
Manifolds, gas exhaust
Muffles, carburizing
Piping, process (alloy only)
Pots, carburizing & annealing
Pots: lead, cyanide & salt
Racks, annealing & carburizing
Racks, sheet pickling
Retorts, carburizing
Rings, neck (compressed gas cylinder)
Tanks, copper annealing
Tanks, pickling
Trays, annealing & brazing
Tubes, annealing
Tubes, furnace vent
Tubes, radiant furnace
Tubes, thermocouple protection
Tubing, corrosion & heat resistant
Tubing Assemblies, welded alloy

The Pressed Steel Company
712 N. Penna. Ave., Wilkes-Barre, Pa.

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Company.....

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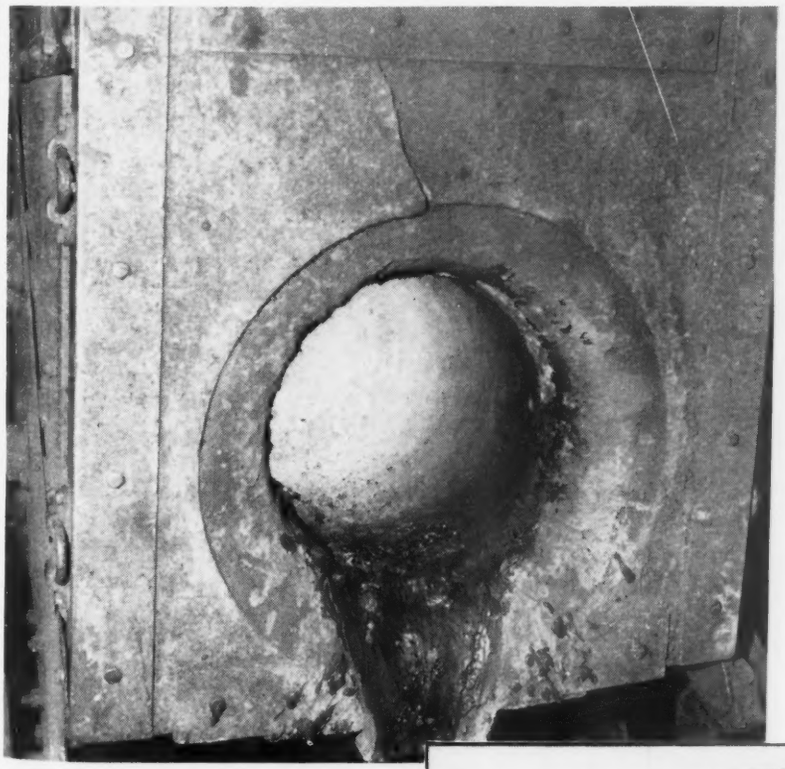
INDUSTRIAL EQUIPMENT OF HEAT AND CORROSION-RESISTANT SHEET ALLOYS

HIGH ALLOY STEEL is being poured here from a 1000-lb. high-frequency induction furnace. It is lined with a Norton MAGNORITE* refractory cement which lasts 16% longer than the cement previously used.



CLOSE-UP OF THE SAME FURNACE, taken immediately after metal has been poured, shows how effectively this engineered-to-the-job Norton MAGNORITE cement resists mechanical and chemical attack.

How much more steel will you melt per lining *with Norton MAGNORITE cements?*

It's easy to find out how much longer Norton MAGNORITE refractory cement will last in your high-frequency furnaces than your present linings. Just call on the 40-year problem-solving experience of Norton Refractory Research which gave this satisfied customer (name on request) 16% longer lasting linings.

Whether you melt straight steel or heat-resistant compositions, you'll get a Norton MAGNORITE cement that's engineered to fit your exact requirements. It will withstand temperatures up to 3250 F. if need be. It will have a high-rammed density that offers great resistance to metal penetration, erosion and chemical attack . . . and freedom from shrinkage cracks that often lead to furnace failure. Why not run a test on one of your furnaces soon?

Whatever your metal-melting problem, you can depend on Norton Research to help you. Working with MAGNORITE, ALUNDUM*, CRYSTOLON* and FUSED STABILIZED ZIRCONIA cements and special shapes, Norton engineers are sure to come up with the right answer for you.

For full details about Norton special, engineered refractories, contact your nearby NORTON refractories engineer, or write to NORTON COMPANY, 311 New Bond Street, Worcester 6, Mass. *Canadian Representative:* A. P. Green Fire Brick Co., Ltd., Toronto, Ontario.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

NORTON

Special REFRACTORIES

Making better products to make other products better

NORTON COMPANY, WORCESTER 6, MASSACHUSETTS

mechanize your manpower

Take the shovel out of a man's hand and put him on the seat of a PAYLOADER. He'll show you how to lick rising costs, how to increase output and solve manpower shortages. Hundreds of foundries and metal working plants have taken this step with highly gratifying results. And PAYLOADERS can do so many jobs that there is hardly any limit to their usefulness.

Every PAYLOADER is a complete Hough-built tractor-shovel specifically designed with multiple reverse speeds and other features that insure fast, low-cost bulk material handling. There are several sizes from the 12 cu. ft. Model HA shown, up to 1½ cu. yd. bucket capacity. They are also available in front-wheel, rear-wheel and four-wheel-drive models.

Every PAYLOADER is backed by 30 years of material handling equipment manufacture and a Hough Distributor with complete parts and service facilities. The Frank G. Hough Co., 703 Sunnyside Avenue, Libertyville, Illinois.

On These Jobs

- Unload box cars.
- Carry sand, coke, scrap, limestone, etc., to storage.
- Transport and distribute sand to molding stations.
- Remove used sand from floors.
- Windrow sand for the cutter.
- Charge mullers, hoppers, tumbling barrels.
- Feed conveyors, elevators, mixers, screenerators.
- Clean up gangways, aisles and other areas.
- Handle coal, ashes, cinders.
- Handle scrap and small castings.
- Maintain private roadways.
- Do cranework — haul, push.
- Remove snow.

HELP for your material handling problems is found in "Industrial Handling" the free Hough magazine. Catalog on any size PAYLOADER is available, without obligation.

PAYLOADER®

THE FRANK G. HOUGH CO. • *Since 1920*

STAR ATTRACTION *in Performance*

CARL-MAYER CORE, MOLD OVENS

LEADING FOUNDRIES LIKE THESE INSIST ON THE BEST:

CARL-MAYER MOLD OVEN

Capacity

200 TONS PER BAKE

At Union Steel Castings Div. of Blaw-Knox Company.

Chosen against several competitive makes.

Door Clearance: 17′ wide, 15′ high. Depth: 40′.

Combination Gas-Oil Fired.

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CONSULT US on your next requirements

Aluminum Co. of America
American Brake Shoe Co.
American Radiator Co.
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Brown Industries
Buick Motor Div. of General Motors Corp.
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Cadillac Motor Div. of General Motors Corp.
Columbia Steel Corp. (U. S. Steel Corp.)
Crucible Steel Castings Co.
Dunkirk Radiator Co.
Eclipse Aviation Division of Bendix Aviation Corp.
Electric Autolite Co.
Ford Motor Co.
Fremont Foundry Co.
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Standard Foundry Co.
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West Michigan Steel Castings Co.
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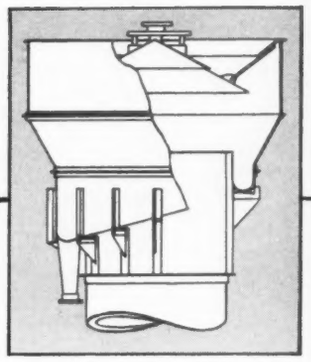
Approximately 90% of our sales are repeat orders.

THE CARL-MAYER CORPORATION

3030 Euclid Avenue • Cleveland, Ohio

WE ALSO BUILD OTHER TYPES OF INDUSTRIAL OVENS AND FURNACES

Over thirty years' experience



SCHNEIBLE

CUPOLA COLLECTORS

WASH OUT FOUNDRY FLY-ASH AND FUMES TO CUT BUILDING MAINTENANCE COSTS

Here's a modern automotive foundry with 8 Schneible Cupola Collectors on guard against corrosion and deterioration. Fly-ash and fumes cannot play havoc with roofs, gutters, stacks or machinery. Building maintenance is kept at a minimum.

These Schneible Collectors effectively wash out the elements that cause nuisance and sluice them away to dewatering and recirculating tanks for easy removal.

Economy of operation and efficiency are outstanding features of these Cupola Collectors. Water conservation is assured because the dewatering tanks are designed to purge and recirculate the same water continuously. There are no moving parts that require maintenance and the water distribution head cannot clog.

Your local Schneible representative has further information or write direct for bulletin No. 449.

CLAUDE B. SCHNEIBLE COMPANY

P. O. Box 81, North End Station
Detroit 2, Michigan

REPRESENTATIVES IN PRINCIPAL CITIES—CONSULT YOUR LOCAL TELEPHONE DIRECTORY.

Late Foundry News

NOVEMBER 21, 1952

EXPANSION GOALS: Higher goals have been established by the Defense Production Administration for potential supplies of a number of materials. Goal for blast furnace ferroalloys has been set at 1½ million tons annually as of Jan. 1, 1954, an increase of 400,000 tons over that of Jan. 1, 1951. Electric furnace ferroalloy capacity is to be raised 511,000 kilowatts to 1,275,000 kw in the same period. Casting goals are 16 million tons for gray iron, 3 million for steel and 1.2 million for malleable iron.

PENDING CONSTRUCTION: Last tabulation of pending applications for rapid tax write-off of new foundry facilities—that of Sept. 5—shows about $10½ million involved. This includes nearly $6 million for steel foundries and $2 million for gray iron. As of that date DPA had approved certificates for 329 foundries covering a proposed investment of almost $116 million. Future work, based on a new expansion goal, will include a $2 million capital investment in brass and bronze foundries to take care of special military requirements and to meet capacity needs in certain local areas.

NEW CASTINGS CHIEF: A. B. Crawford, on leave from Continental Foundry & Machine Co., Pittsburgh, is new chief of the Castings Section, Iron and Steel Division, NPA, effective Dec. 15. He succeeds A. J. McDonald, chief since the section was formed two years ago, who has resigned but who will continue to reside in Washington.

STAYS IN NPA: Reversing previous plans, NPA's Metalworking Equipment Division has extended indefinitely the life of its Foundry Equipment Section. New chief of the section is George P. Fisher, one-time Whiting Corp. vice president and recently associated with the section.

MORE NICKEL: Total annual supply of 190,000 tons of nickel by 1955 is planned. This figure, including both domestic production and imports, would be 58,000 tons more than the goal set for 1954 and 89,000 tons over the U. S. available supply in 1950.

CASTING SUPPLY UP: Carbon and low-alloy steel castings under 3000 pounds now are listed by DPA's Conservation Division among metals in approximate balance. They were formerly classed in short supply, a designation still given heavy steel and gray iron castings. Light gray iron and malleable castings continue termed in fair to good supply. Magnesium foundries claim the latter classification also should apply to their products, stating capacity is substantially greater than demand. The latest "List of Basic Materials and Alternates" issued by DPA puts magnesium in the approximate-balance category.

MAGNESIUM OFFICERS: At the recent eighth annual meeting of the Magnesium Association, these new officers were elected: President, J. S. Kirkpatrick, director of research and development, Brooks & Perkins Inc., Detroit; vice president, W. C. Murray, Utica Radiator Corp., Utica, N. Y.; treasurer, R. D. Taylor, Federated Metals Division, American Smelting & Refining Co., New York.

ALUMINUM TIGHTENS: Curtailed power supply, the result of low water, is said to be cutting primary production of aluminum about 20,000 tons monthly, or one-fourth of capacity. By year-end producers expect to have backlogs of 75,000 tons, and have asked the government to defer stockpiling until the supply situation eases. Canada has agreed to divert an additional 38,500 tons to the U. S., but most of it will not arrive until next quarter. Foundries dependent on primary aluminum ingot used in castings for defense orders are feeling the pinch, but supplies of secondary ingot have been fairly easy to date.

CAST AMMUNITION: The fact that a large share of the capacity for producing artillery shells can be shifted from rolled steel bars to cast steel may obviate further expansion in bar facilities. For smooth-bore guns, such as mortars and recoilless rifles, cast steel shells appear entirely satisfactory. For rifled guns the shells probably will continue to be made from steel bars. Three steel foundries currently are major sources of cast shell supply.

GRAPHITE EXPANSION: Annual production capacity of artificial graphite in 1953 is estimated at 332 million pounds, 30 million higher than on Jan. 1, 1951. Carbon electrode capacity is expected to be 202 million pounds in 1953 and 222 million in 1954.

FERROMANGANESE: Because lower manganese content of most imported manganese ore has caused a pricing penalty on ferromanganese producers, the industry's NPA advisory committee has asked that specifications for standard high-carbon grades be revised downward. Standard

ferromanganese now must contain 78-82 per cent manganese; the committee says this should be changed to 72-76 per cent.

REFRACTORIES: Expansion in capacity for production of refractories is expected to be completed next year. Geared to the increased requirements of the metallurgical industries, the larger facilities are counted on to provide ample supplies of insulating fire brick, fire clay, super duty and high alumina brick, ladle brick, silica refractories, pouring refractories, and basic refractories.

RENEGOTIATION: The government Renegotiation Board thinks that only about one-half of the approximately 14,000 contractors and subcontractors who received more than the statutory minimum of $250,000 for defense work in 1951 will require renegotiation of their contracts at the end of the year. Established pricing policies of defense agencies are said to reduce suppliers' chances of realizing excessive profits.

STOCKPILE: At mid-1952 the federal strategic stockpile was valued at more than $3.5 billion, and additional materials valued at $1.9 billion were on order. During the first half this year, $148 million worth of various metals—including aluminum, copper and nickel—was diverted from the stockpile to industrial projects.

MISCELLANY: National Malleable & Steel Castings Co. will spend $2 million to build a second foundry at its Capitol Foundry Co. near Phoenix, Ariz. The plant will produce general castings for the mining industry. . . Brooks Furnace Co., Albion, Mich., has changed its name to Brooks Foundry Inc. . . . The Army is reported to have decided to specify rubber instead of cast steel for tracks on future tank orders . . . A 15-man team from five European countries recently completed a four-week study of American magnesium fabricating and casting methods . . . F. S. Wellman has become chairman of Wellman Bronze & Aluminum Co., Cleveland, and has been succeeded as president by his son, D. T. Wellman . . . George P. Krumlauf, recently chief metallurgist, Hamilton Foundry & Machine Co., Hamilton, O., is new metallurgical engineer for Republic Steel Corp.'s pig iron division, succeeding the late Thomas G. Johnston.

PRICES OF FOUNDRY METALS AND COKE

(As of Nov. 21, 1952)

FOUNDRY COKE

(Per net ton, f.o.b. ovens)

BEEHIVE	
Connellsville	$16.50-17.50
New River	20.80
Wise County	15.95
OVEN	
Birmingham	$20.30
Chicago	23.00
Detroit	24.00
Erie, Pa.	23.50
Everett, Mass.	24.80
Indianapolis	22.75
Kearney, N. J.	22.75
Milwaukee	23.75
Painesville, O.	24.00
Philadelphia	22.70
Neville Island (Pittsburgh)	23.00
Portsmouth, O.	22.50
St. Louis (delivered)	25.40
Swedeland, Pa.	22.60
Terre Haute, Ind.	22.50

PIG IRON

(Per gross ton, f.o.b. furnace)

	No. 2 Foundry	Malleable
Bethlehem, Pa.	$57.00	$57.50
Birmingham	51.38	....
Buffalo	55.00	55.50
Chicago	55.00	55.00
Cleveland	55.00	55.00
Everett, Mass.	59.25	59.75
Fontana, Calif.	61.00	....
Geneva, Utah	55.00	....
Granite City, Ill.	56.90	57.40
Lone Star, Tex.	51.00	51.00
Neville Island (Pittsburgh)	55.00	55.00
Steelton, Pa.	57.00	57.50
Swedeland, Pa.	59.00	59.50
Toledo, O.	55.00	55.00
Troy, N. Y.	57.00	57.50
Youngstown, O.	55.00	55.00

NONFERROUS INGOT

BRASS AND BRONZE: 85-5-5-5—27.25c; 88-10-2—40.00c; 80-10-10 — 33.00c; No. 1 yellow — 23.25c.

ALUMINUM: 99 per cent plus, primary ingots 20.00c. Secondary No. 12 alloy 19.50c. Deoxidizing grades: No. 1 18.80c; No. 4 18.20c.

MAGNESIUM: 99.8 per cent standard ingots 24.50c, f.o.b. Freeport, Tex.

COPPER: Electrolytice 24.50c, Connecticut valley; Lake 24.62½c, delivered.

ZINC: High grade 13.85c, delivered. Die casting alloy 17.00c, delivered.

IRON AND STEEL SCRAP

(Ceiling prices per gross ton as established by the Office of Price Stabilization)

	*No. 1 Bundles	Cast Steel	**Steel, 2 ft & less	Punchings, Plate Scrap	Cast Iron Briquets
Birmingham	$39.00	$44.00	$39.00	$41.50	$39.00
Buffalo	43.00	48.00	43.00	45.50	43.00
Chicago	42.50	47.50	42.50	45.00	42.50
Cincinnati	43.00	48.00	43.00	45.50	43.00
Cleveland	43.00	48.00	43.00	45.50	43.00
Detroit	41.15	46.15	41.15	43.65	41.15
Eastern Pa.	42.50	47.50	42.50	45.00	42.50
Los Angeles	35.00	40.00	35.00	37.50	35.00
Pittsburgh	44.00	49.00	44.00	46.50	44.00
San Francisco	35.00	39.00	35.00	37.50	35.00
St. Louis	41.00	46.00	41.00	43.50	41.00
Seattle	35.00	40.00	35.00	37.50	35.00

Above delivered prices are ceiling levels at basing points indicated. * Applies to dealer and industrial scrap; No. 1 and No. 2 heavy melting steel are $1 less; No. 1 railroad heavy melting is $2 higher. **$2 higher if 1 ft or under.

CAST IRON SCRAP

No. 1 cupola cast	$49.00
Heavy breakable cast	45.00
Burnt cast iron	41.00
Cast iron brake shoes	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Iron wheels, No. 1	47.00
Malleable	55.00
Drop broken machinery cast	52.00

Above ceiling prices, per gross ton, are f.o.b. shipping point. Add transportation charges to obtain delivered prices at any foundry.

May we tell YOU what we know about

SHELL MOLDING

?

Equipment for Shell Molding

We manufacture shell molding equipment of unique and advanced design. It has been proven in production and is available in types and sizes including small inexpensive machines to fit your particular requirements. If you would like to know more about shell molding equipment, we will be glad to send you complete information.

Patterns for Shell Molding

We have developed a truly revolutionary new process (patents applied for) for making low-cost shell mold patterns *from your present pattern equipment.*

Engineering Service on Shell Molding

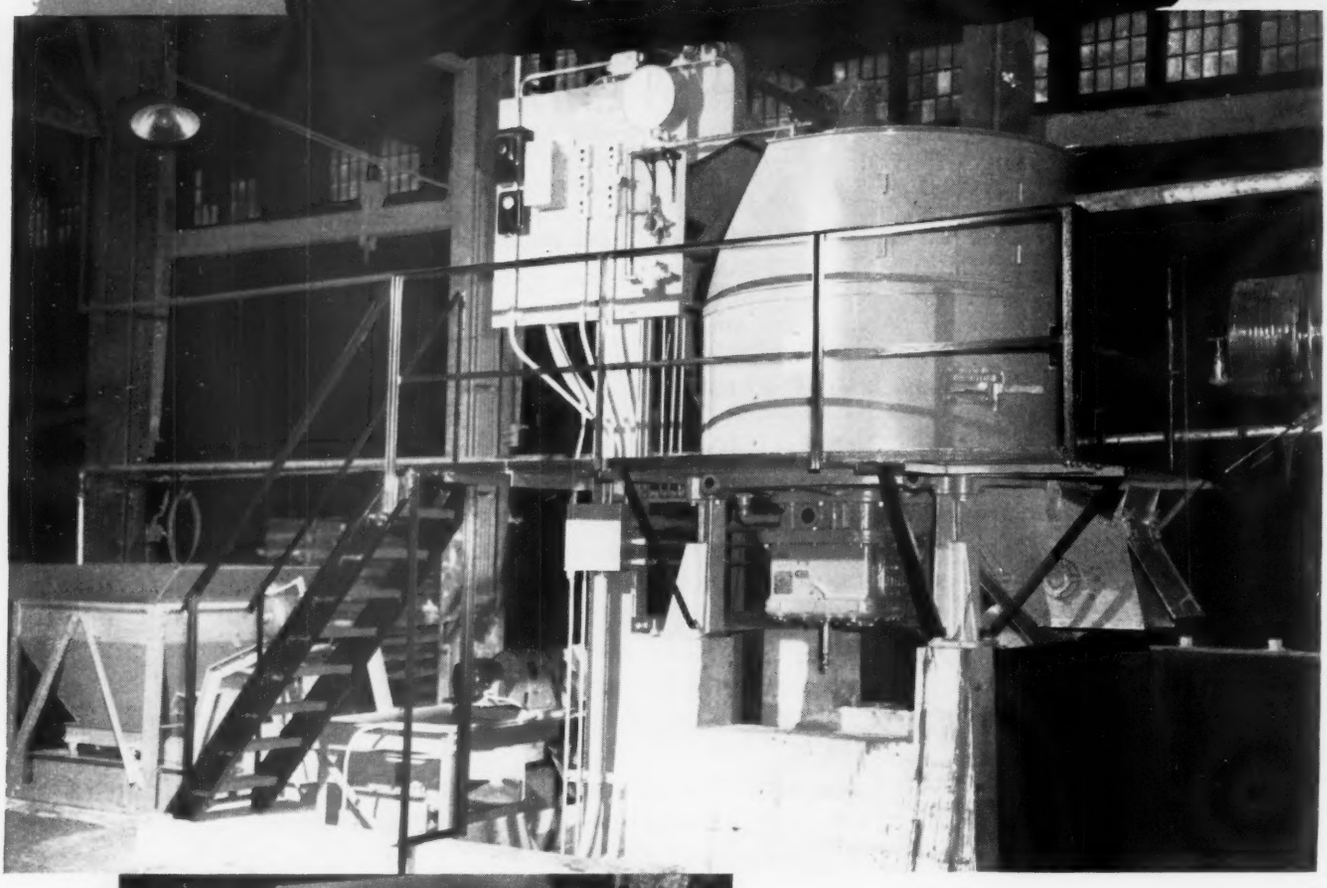
We have been designers and builders of machine tools and special machinery for the past 25 years. Our experience and "know-how" on shell molding is, we think, rather broad. We have an established research, development and test laboratory for studying shell mold problems and processes. *We invite your questions.*

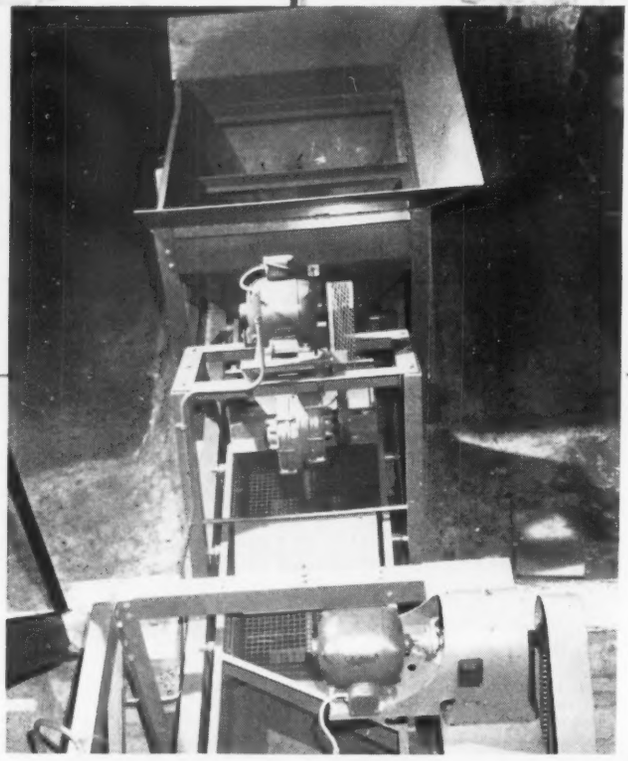
Bulletin "F"—If you will send us your particular questions, we will be glad to discuss them for you and will be happy to send you a special Letter-bulletin "F" which deals with the services described above.

WINTER ENGINEERING COMPANY & SHELLCAST CORP.

1200 NIAGARA, BUFFALO 13, N. Y.

NEW SIMPSON *MIX-MULLER* CUTS SAND PREPARING TIME BY 32 MAN-HOURS





Illustrated above is a "control panel" view of the No. 2 Simpson Mix-Muller installed in the Davis & Furber Machine Company textile machinery foundry at North Andover, Mass.

Illustrated at the left is another view of the same Simpson Mix-Muller—National "Utility" Unit installation, showing a section of the Screening and Conveyor machinery integrated with the Mix-Muller for maximum efficiency in a minimum of floor space.

Davis and Furber Machine Company finds performance of new unit *"exceeds greatest expectations"*

The Davis and Furber Company of North Andover, Mass., have been building textile machinery and parts for over 100 years.

To meet their requirements, foundry equipment must perform in keeping with a long established record for sound castings used in a dependable line of machinery. To *exceed* their performance expectations is a big order . . . but here's what Davis and Furber have to say about their new No. 2 Simpson Mix-Muller and Sand Preparing Unit:

1. Sand preparing time cut by 32 man-hours. Previous methods required 5 men calling for 40 man-hours per day. Same amount of work is now done with 2 men in 4 hours.

2. Sand quality vastly improved. In addition to saving valuable man-hours the Simpson Unit is producing higher quality sand with better flowability . . . casting finish is improved . . . less bonding material is needed to produce required green strength.

3. Improved efficiency. *All* sand is now mulled in the Simpson and processed in one location . . . thus reducing labor and expense involved with floor preparation.

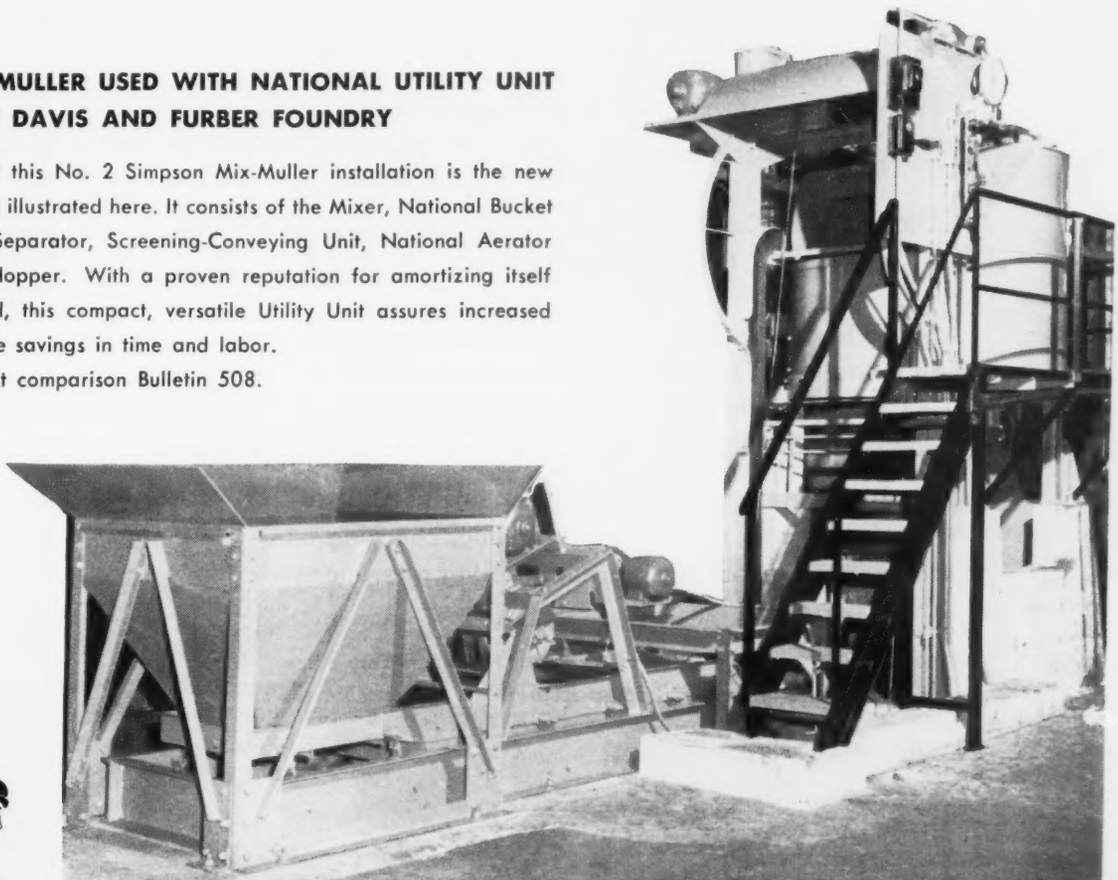
It is gratifying to report the satisfaction of *experienced* foundrymen with Simpson and National Equipment. Why not investigate how the Simpson Mix-Muller can save *you* time . . . yes, and make you money . . . in reducing costs and improving the utility of your foundry operation.

Write for Bulletin 511.

SIMPSON MIX-MULLER USED WITH NATIONAL UTILITY UNIT AT DAVIS AND FURBER FOUNDRY

An integral part of this No. 2 Simpson Mix-Muller installation is the new National Utility Unit illustrated here. It consists of the Mixer, National Bucket Loader, Magnetic Separator, Screening-Conveying Unit, National Aerator and Sand-holding Hopper. With a proven reputation for amortizing itself over a short period, this compact, versatile Utility Unit assures increased output with welcome savings in time and labor.

Write for the cost comparison Bulletin 508.



National Engineering Company
(Not Inc.)
608 Machinery Hall Bldg. • Chicago 6, Illinois

SIMPSON *Intensive* **MIX-MULLERS**

Manufacturers and Selling Agents: For Continental European Countries — George Fisher, Ltd., Schaffhausen, Switzerland; for British Possessions — August's Limited, Halifax, England; for Canada — Dominion Engineering Co., Ltd., Montreal; for Australia and New Zealand — Gibson, Battle & Co., Pty., Ltd., Sydney, for Argentina, Brazil and Uruguay — Equipamentos Industriais EISA Ltda., Sao Paulo, Brazil; for Mexico — CASCO ,S. De R.L., Mexico, D.F.

TAM*
ZIRCONITE*
ALL-PURPOSE PASTE WASH

Outstanding results are reported for TAM ZIRCONITE Paste Wash in diversified applications by many leading foundries:

CORE MUD...to prevent metal cutting into joints between core halves (slightly thinned).

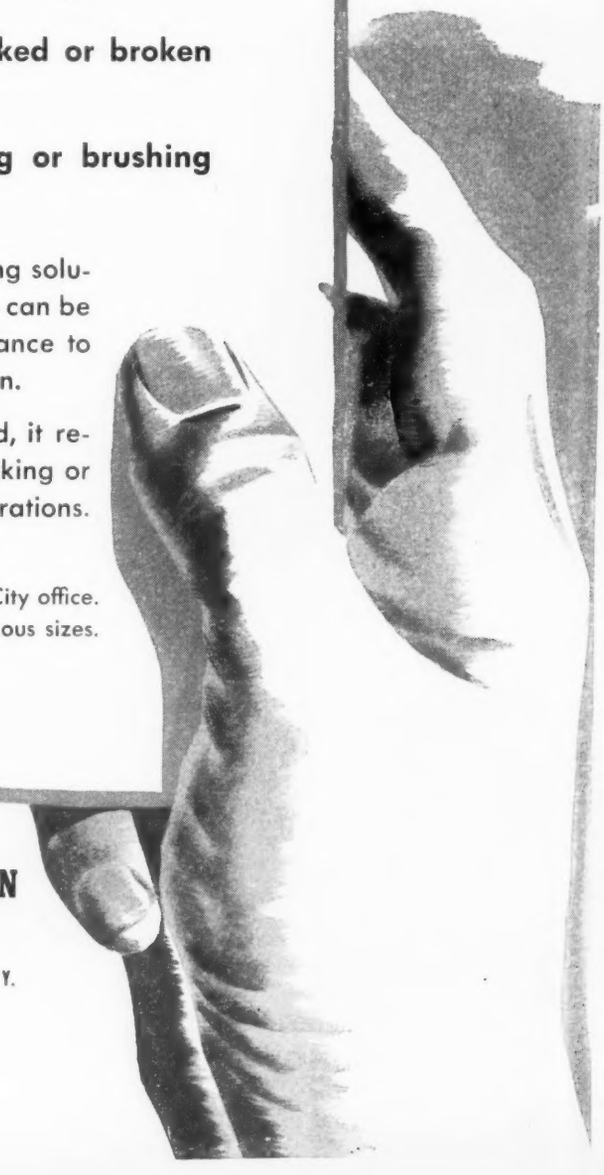
CORE PATCHING...to patch up cracked or broken cores (without diluting).

CORE WASH...for dipping, spraying or brushing cores in green or baked state.

Among important advantages...any washing solution made from TAM ZIRCONITE Paste Wash can be used ***immediately after preparation.*** Resistance to settling eliminates need for constant agitation.

Because of the multiple bonding agents used, it remains on core or mold without peeling, checking or spalling throughout baking and pouring operations.

For detailed information, write our New York City office. Supplied in easily-handled steel drums of various sizes.



TAM PRODUCTS
Registered U. S. Pat. Off.

TITANIUM ALLOY MFG. DIVISION
NATIONAL LEAD COMPANY
Executive and Sales Offices: 111 BROADWAY, NEW YORK CITY
General Offices, Works and Research Laboratories: NIAGARA FALLS, N. Y.

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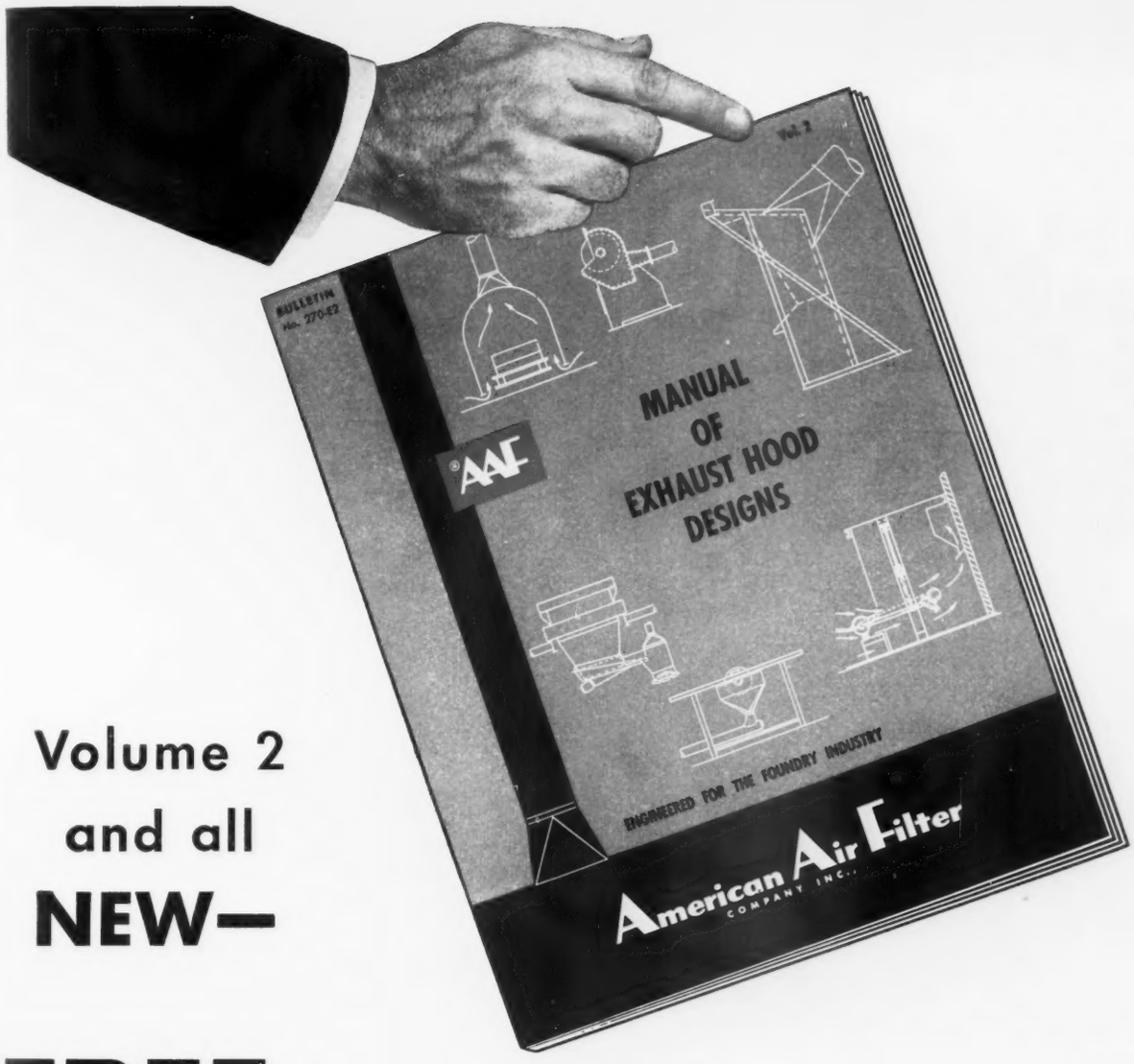

Volume 2
and all
NEW—

FREE manual for Foundries

Presenting proven methods for increasing efficiency of Dust Control Systems

Here's a "must" for foundrymen who want facts. It's the second in the series. Volume 2 of AAF's Manual of Exhaust Hood Design — a complete engineering reference on hood designs and applications for foundry dust control systems. Twenty-eight pages of basic data; tables of exhaust requirements; dust concentrations and weights of collected material; hood sketches; and over 60 foundry installation photos. Special sections include:

- Snagging and Portable Grinding
- Swing Frame Grinding
- Abrasive Cleaning
- Melting Furnaces
- Sand Handling
- Shakeouts

AAF

A copy of this new Manual of Exhaust Hood Design is free for the asking. No obligation— just fill out and mail the coupon today.

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COMPANY, INC.
266 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.
Pacific Division Office, San Francisco, California

American Air Filter Company, Inc.
266 Central Avenue
Louisville 8, Kentucky

Please send me your new Manual of Exhaust Hood Design, Volume 2.

NAME_____

TITLE_____

COMPANY_____

CITY_____ STATE_____

POWDER-WASHING SPEEDS CLEAN-UP

Removes excess and defective metal quickly, easily, and at low cost

Cleaning-floor bottlenecks eliminated, production up, costs down, scraps and recasts negligible—that's the gist of enthusiastic reports on LINDE's powder-washing process.

Powder-washing combines the quiet speed of oxygen-cutting with a surface quality comparable to finish grinding. It removes fins, pads, sand inclusions, penetrations, burned core sand, chill bars, nails, chaplets, cracks and tears. It finishes flat or uneven surfaces to close tolerances with equal ease. And the powder-washing flame gets into places where other equipment can't.

Powder-washing can be applied to any carbon or alloy-steel casting. Equipment is simple. Technique is easily mastered in a short time.

For further details, telephone or write today. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Dominion Oxygen Company, Limited, Toronto.

WHAT DO FOUNDRYMEN SAY ABOUT POWDER-WASHING?

"... powder-washing does for us in two hours what required one day of chipping."

*

"An hour of powder-washing has replaced four to six hours of grinding."

*

"Increased production and reduced labor and overhead more than make up for the cost of gases and powder consumed."

*

"... the equivalent of four days' chipping in one and one-half hours."

*

"... a casting which formerly required one hour of grinding is cleaned by powder-washing in less than five minutes."

*

"Powder-washing cleaned one casting in an hour, the other in 30 minutes. Conditioning by chipping and grinding would have taken three and two days respectively."

*

"... removed the shifted cores and penetrations with a saving of several hundred man hours."

*

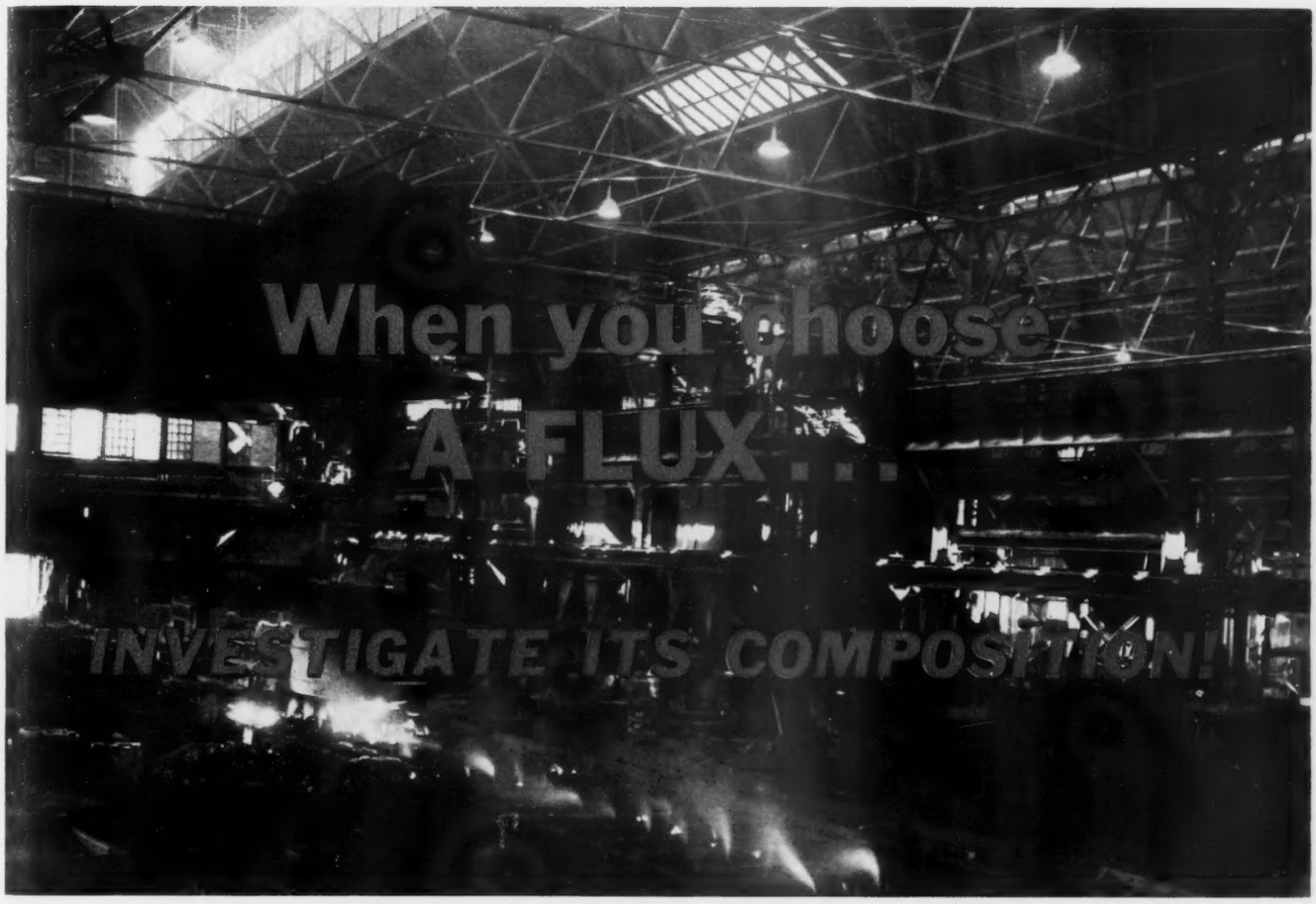
"... in a few hours, cleaned up housings that otherwise would have had to be scrapped."

*

"... washed out a layer of sand from inside the cylinder in less than two hours, a job we could have done with no other available equipment."

LOOK TO *Linde* Trade-Mark know-how . . . show-how . . . products and processes FOR WELDING, CUTTING, TREATING, FORMING METALS

The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.



IT MAKES A DIFFERENCE IN PERFORMANCE

Many times you can save money and avoid useless stockpiles of materials if you investigate the composition of your foundry supplies. It is much easier to tell what a material can do if you know its chemical composition. This is especially true with fluxing agents.

NEXT TIME YOU CHOOSE A FLUX, INVESTIGATE SULTRON. Sultron acts as a fluxing agent in the cupola *and* as a desulphurizer in the ladle. Some fluxes cannot do both because of their chemical composition. It's easy to see the savings with SULTRON.

SULTRON is the trade name given to *all* sodium sesquicarbonate, or trona, sold to the foundry industry. It is available only from American Silica Sand Company.

Industry-wide swing to SULTRON increased when a prominent metallurgist recently chose it for tests conducted during production of synthetic pig iron. He found it ". . . produced less erosion in the forehearth with equal removal properties at less cost." Specifically he found it cut sulphur below 0.050 in the forehearth.

SULTRON is sold in two sizes—for use in the cupola or in automatic feeders. If you investigate the composition of the next flux you buy—you'll choose SULTRON!

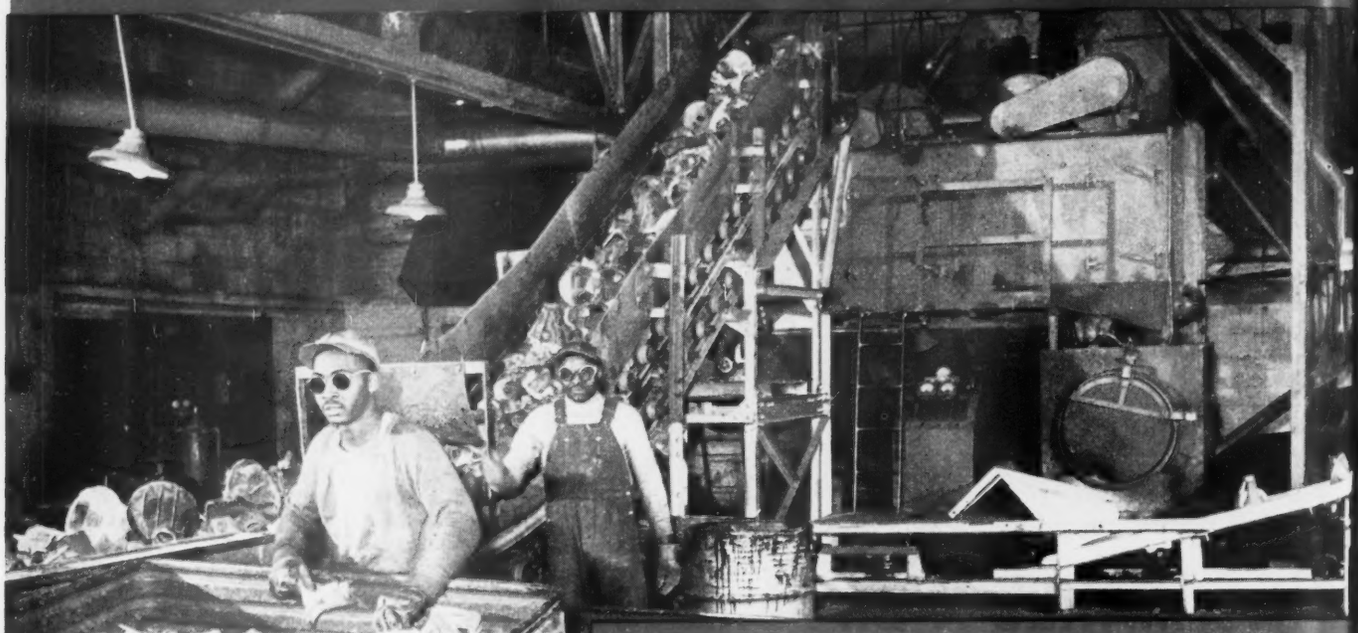
Sodium sesquicarbonate, trona or SULTRON all mean the same . . . efficient fluxing and desulphurization.

American
Silica Sand Co.
OTTAWA, ILL

Suppliers of: Crude and dried crude silica sand • *SULTRON*® flux • Australian zircon sand • Zircon flour

®*SULTRON* is the trademark of Westvaco Chemical Division, Food Machinery and Chemical Corporation, for its brand of sodium sesquicarbonate.

WHEELABRATOR® CONTINUOUS TUMBLAST



1. Malleable castings being piled onto the loading conveyor of the 48" Continuous Wheelabrator Tumblast.

2. Sectional view of the Continuous Tumblast. Note the effective cross blast of the overhead Wheelabrator units.

THE AMERICAN MOLDER

American

WORLD'S LARGEST BUILDERS OF

Cleans 12 Tons of Hard Iron Hourly

Replaces 5 Machines in Cleaning Malleable Castings

at AUTO SPECIALTIES MFG. CO.

Malleable casting cleaning—both in the hard iron stage and again after annealing—is on a production line basis at Auto Specialties Mfg. Co. Two Continuous Wheelabrator Tumblasts provide low-cost, continuous, smooth-flow operations in cleaning a large volume of miscellaneous work. Their performance has proved the Continuous Tumblast to be the economical answer to modern, fast production schedules.

CONTINUOUS HARD IRON CLEANING

Another Wheelabrator first! Continuous, automatic and uniform cleaning of hard iron castings —at the prodigious rate of 12 tons of varied sizes and shapes hourly.

Still hot, the hard iron work enters the Continuous Wheelabrator Tumblast within an hour after being poured. All molding sand is removed without breakage of fragile pieces. In addition, cleaning in the hard stage makes annealing faster, more thorough and simplifies removal of annealing scale.

CLEANS 100 TONS OF MALLEABLE CASTINGS DAILY

Five batch type machines, with operators, and a sorting and inspection crew were formerly required to handle malleable cleaning requirements in around-the-clock operation. With the Wheelabrator Continuous Tumblast from six to ten tons, often more, depending upon the type, are cleaned hourly.

Savings realized with this high production cleaning machine are amazing. Labor costs are slashed —no operating labor required and sorting crew reduced over 50%. Overall savings are estimated to return the complete investment in a year's time. As a result of this outstanding performance a similar machine has been installed in their Canadian plant.

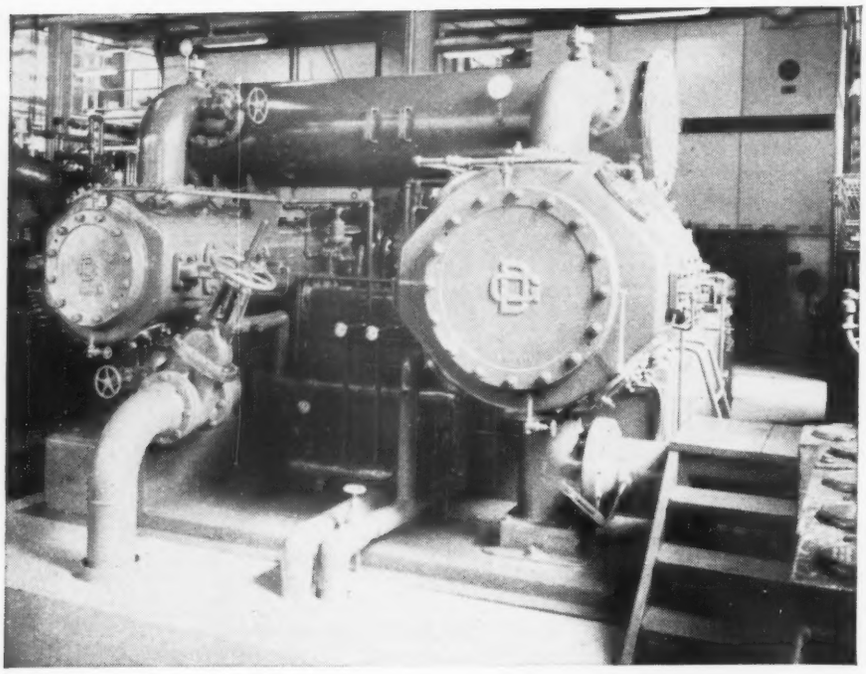
RESULTS ACHIEVED AT AUTO SPECIALTIES

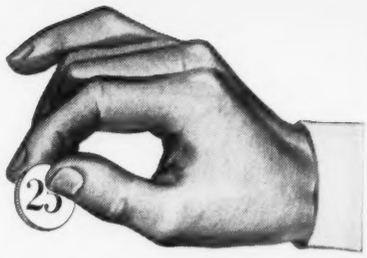
1. Continuous, uniform cleaning.
2. High rate of production.
3. Elimination of handling (Transporting-Storage)
4. More orderly sorting.
5. Saving in valuable floor space.
6. Increased foundry efficiency through a more orderly flow of work.
7. A single machine for each type of iron effectively cleans the hundreds of sizes and types of castings produced.
8. Savings effected pay for equipment.

WRITE TODAY FOR COMPLETE INFORMATION

Informative literature is available on each of the four sizes of Continuous Tumblasts.

WHEELABRATOR & EQUIPMENT CORP.
505 S. BYRKIT STREET
MISHAWAKA 2, INDIANA
MANUFACTURERS OF AIRLESS BLAST EQUIPMENT





$1.25

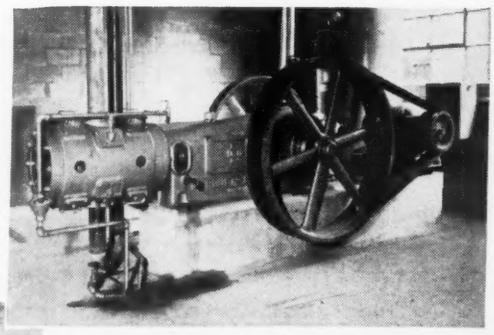
Pin Money Maintenance!

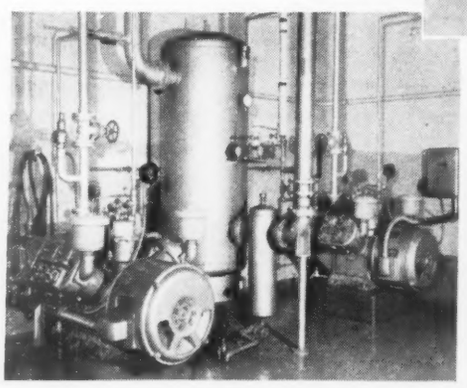
That's all it takes to keep a Gardner-Denver HA Compressor puffing away at top efficiency. One HA, for example, has been handling the full air load in a southern foundry and manufacturing plant for eight years—and has required only $10.00 for maintenance. That's $1.25 a year!

How come? A look at the soundly built power end and the reliable lubricating system will give you some of the answers.

And how about operating costs? They're unusually low, too—thanks to Gardner-Denver correctly designed air cylinders and low-lift "Air Cushioned" valves.

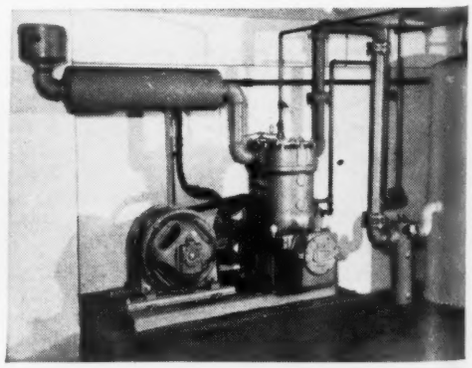
Another dependable compressor —the Gardner-Denver RX.





Space-saving efficiency—with Gardner-Denver WB Compressors.

For low-cost compressed air in any volume—choose Gardner-Denver Compressors. Write today for full details.



For continuous service— Gardner-Denver AA Compressors.

SINCE 1859

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois
In Canada:
Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

can't burn out when stalled

Sensationally Different

KELLER Air Hoist

with positive displacement piston-type air motors

VARIABLE SPEED

from 0 to 17 fpm permits safe handling of fragile loads. The load hook can be "inched" up or down for accurate spotting.

LIGHTWEIGHT

A 1,000-lb capacity hoist weighs only 30 lb —easy to carry up or down a ladder, and move from job to job.

LOW MAINTENANCE

because of simple design. Only a few working parts, and these are fully enclosed. Two grease fittings lubricate all working parts.

DUST, FUMES

cannot injure an air motor. Nor will it burn out, even if stalled all day long.

CONTINUOUS DUTY

Keller Air Hoists can be used continuously over periods of hours (or days) without danger of shortening motor life.

Finger-tip control enables the Keller Hoist to handle fragile loads safely.

SEND FOR FULL INFORMATION

KELLER TOOL CO., 4500 Race St., Grand Haven, Mich.

Please send me illustrated literature and prices of Keller Air Hoists.

Name_____

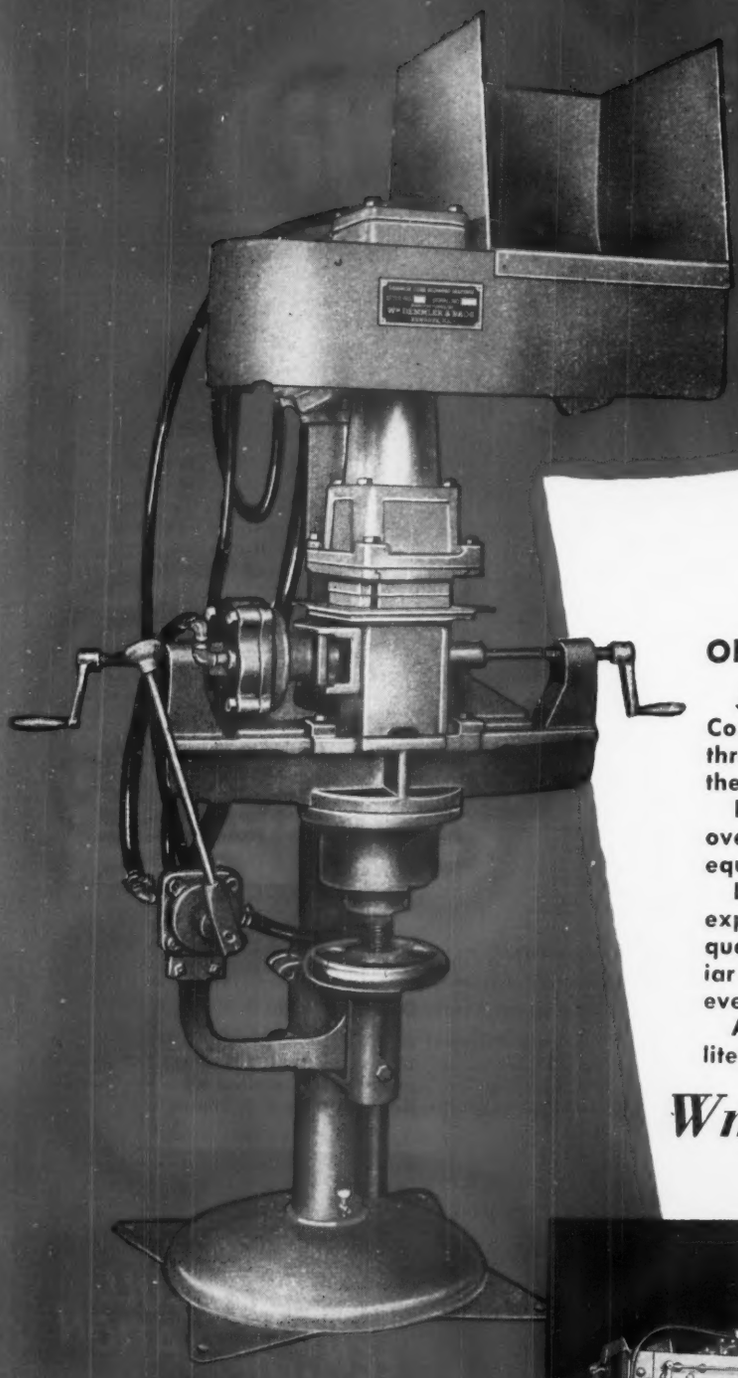
Title_____

Company_____

Address_____

City_____ Zone____ State_____

Profits Multiply...



DEMMLER
NO. 55

MANUFACTURERS OF CORE BLOWERS
EXCLUSIVELY SINCE 1911

DEMMLER
CORE BLOWERS

OFTEN COPIED — NEVER EQUALLED

Join the thousands who depend upon DEMMLER Core Blowers to assure them greater profits through an efficiency that sets the standards for the industry.

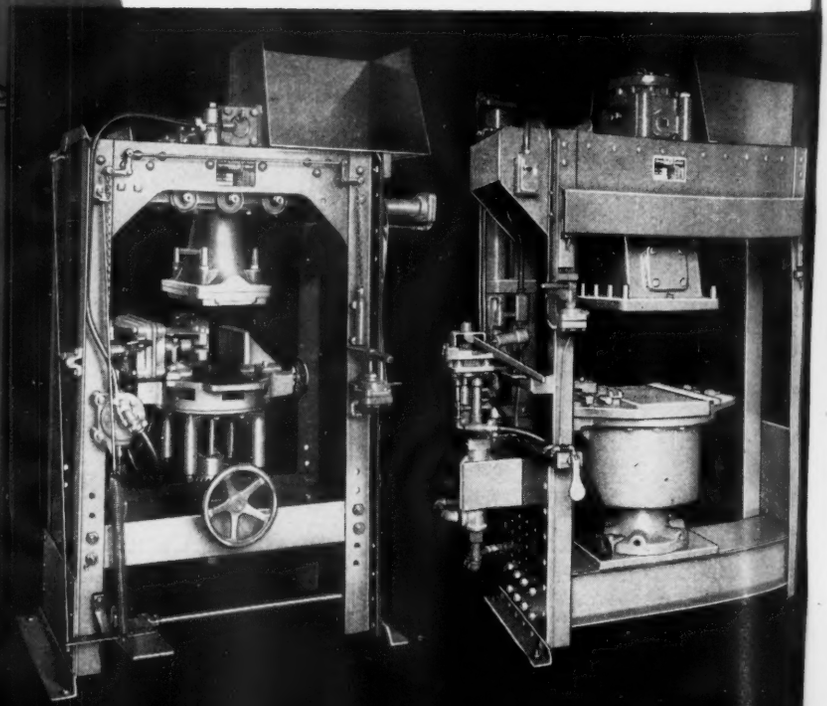
DEMMLER Core Blowers have led the field for over 40 years. They are often copied—never equalled!

Little wonder that Foundrymen have come to expect outstanding performance and matchless quality from every core blower bearing the familiar DEMMLER name. There's a machine to meet every core blowing requirement.

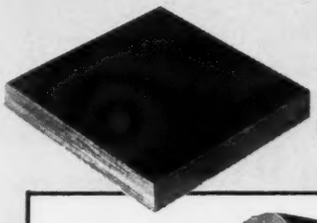
A letter stating your needs will bring descriptive literature promptly. Write today!

Wm.* DEMMLER *& Bros.

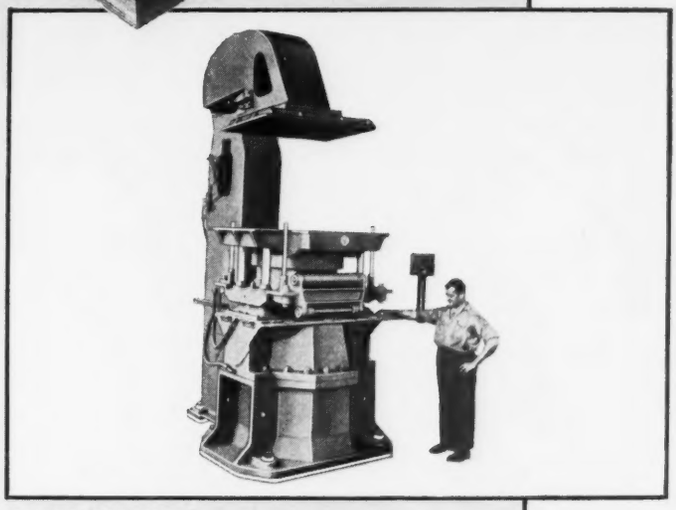
Kewanee, Illinois



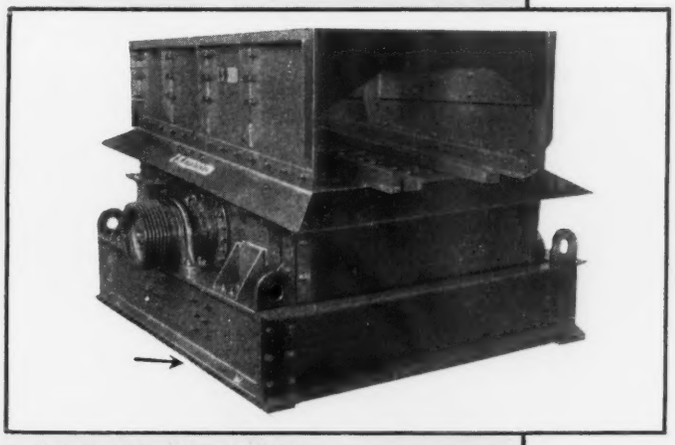
DEMMLER NO. 1 DEMMLER NO. 3F



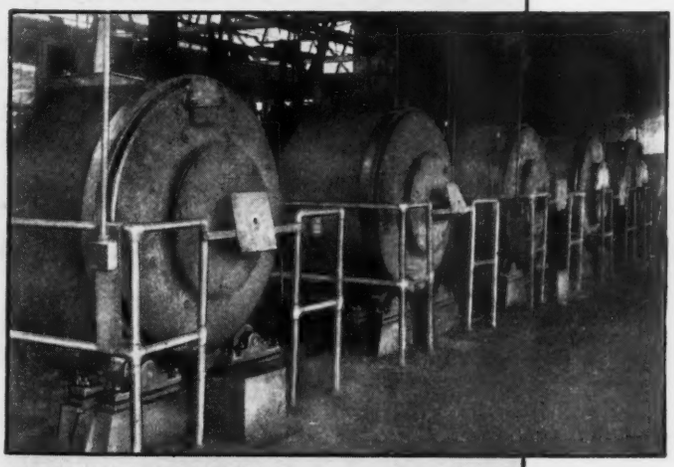
FABREEKA



JOLT MOULDER



SHAKEOUT MACHINES



TUMBLING BARRELS

IT PAYS TO SPECIFY FABREEKA

Mountings For

FOUNDRY MACHINES

THE FOUNDRY is one of a wide variety of industries in which FABREEKA has been used for many years for mounting heavy equipment where the absorption of impact shock and the isolation of transmitted vibration is desired. By adjusting itself to slight inaccuracies of bearing surfaces, FABREEKA distributes the load properly, prevents chipping or breaking of concrete and prolongs the life of both machines and building. FABREEKA reduces noise, prevents structural fatigue, helps maintain alignment, eliminates grouting, and reduces maintenance and breakdowns. FABREEKA is built to give years of service under the most severe operating conditions.

Write For Latest Engineering Data

FABREEKA PRODUCTS COMPANY
INCORPORATED
222B SUMMER STREET, BOSTON 10, MASSACHUSETTS
NEW YORK CHICAGO DETROIT SPARTANBURG
PHILADELPHIA PITTSBURGH OAKLAND

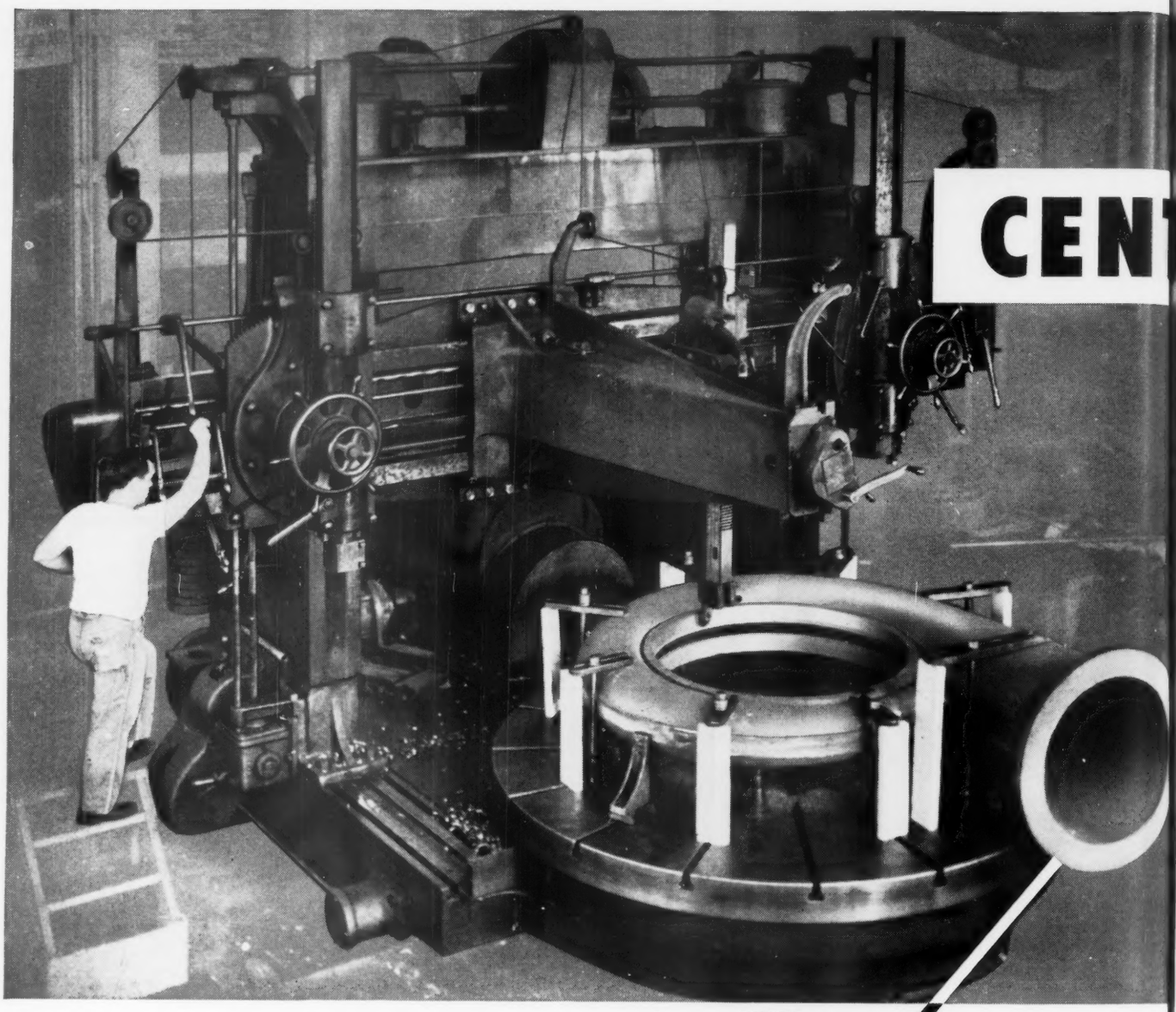
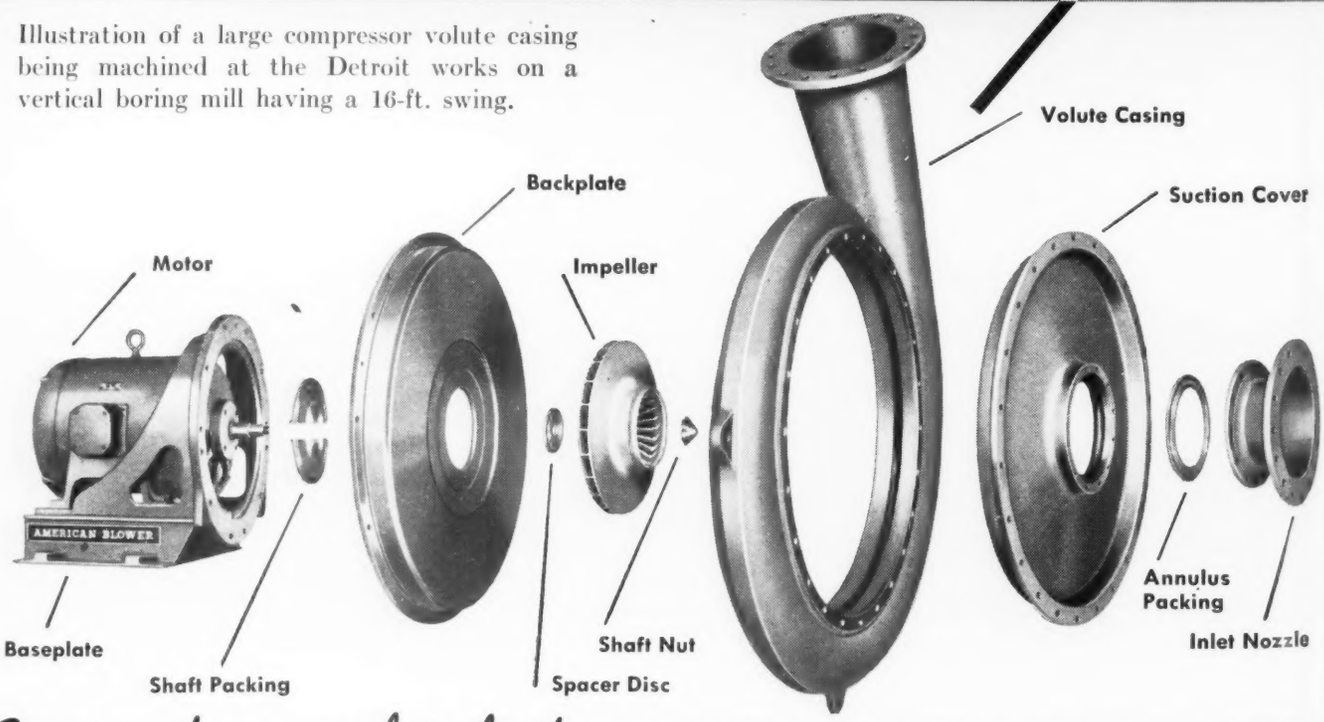


Illustration of a large compressor volute casing being machined at the Detroit works on a vertical boring mill having a 16-ft. swing.

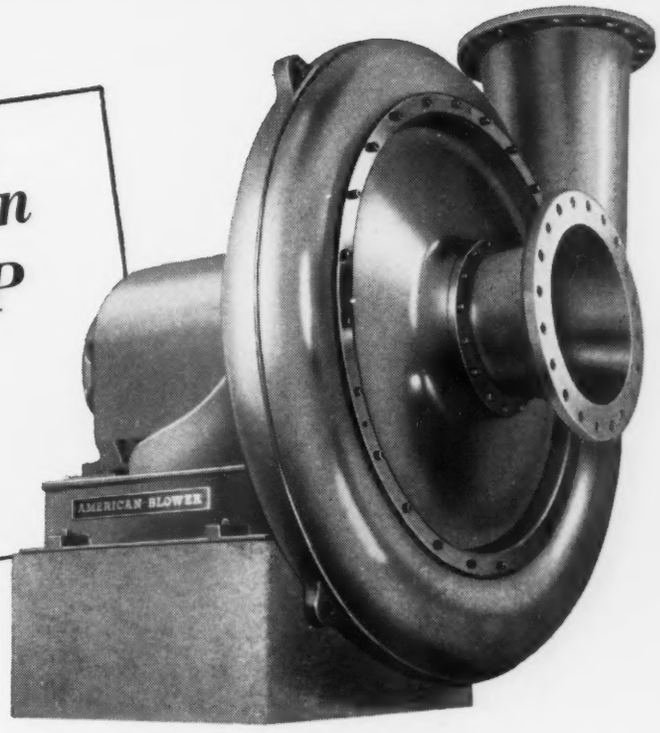


Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER

AMERICAN BLOWER

RIFUGAL COMPRESSORS

Single Stage Design
Sizes: 30 to 600 HP
Pressures:
1 1/4 to 3 3/4 lbs.



Take an excellent design, quality materials, modern machine tools, superior research and testing facilities, skilled engineers and craftsmen — and you have the important factors behind American Blower's outstanding line of centrifugal compressors. To you, this insures a quality product built and backed by a great name in air handling.

American Blower Centrifugal Compressors efficiently deliver large volumes of air or gases. They're compact, require minimum foundations and are adaptable to all types of drives.

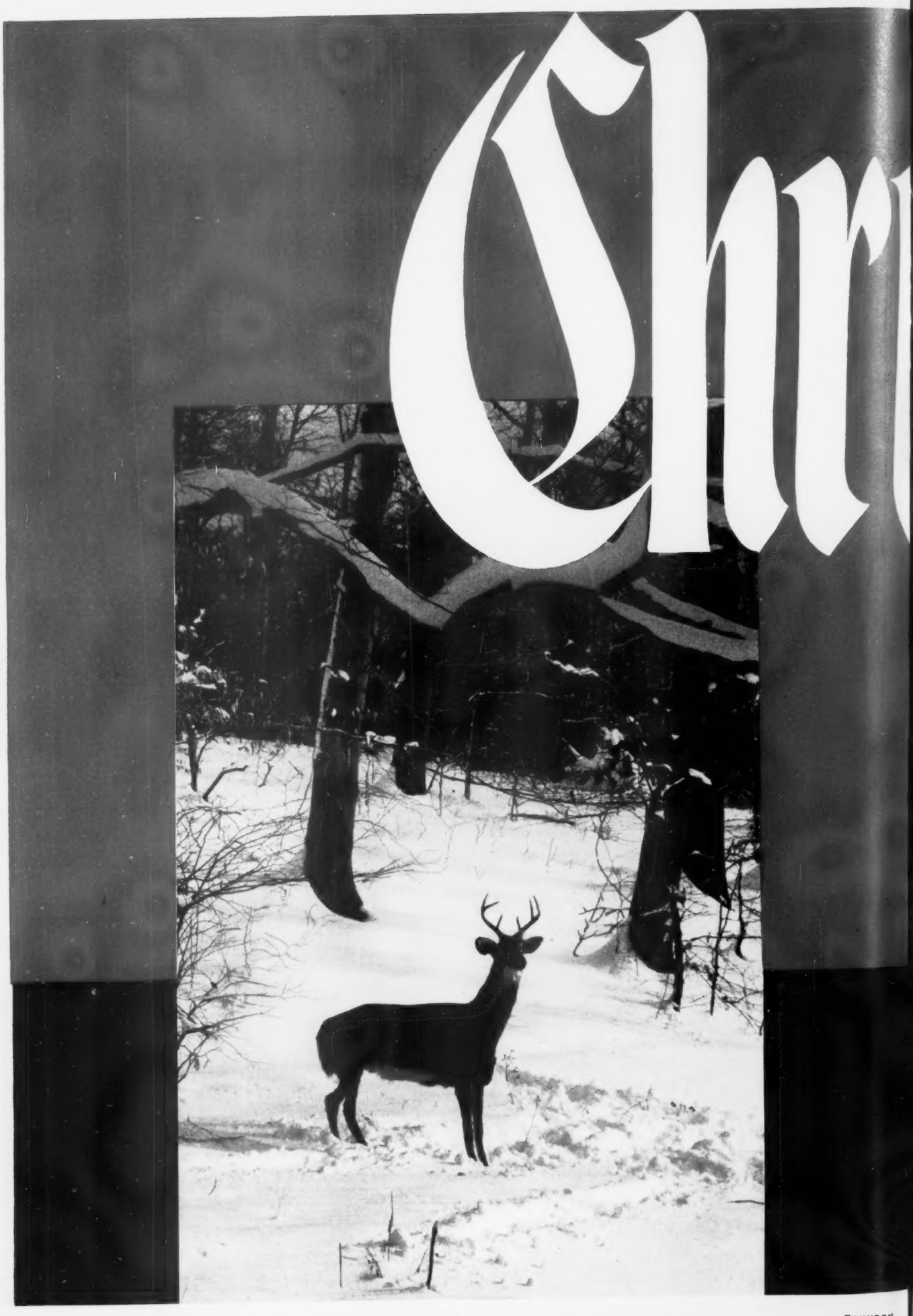
Next time you want bids on centrifugal compressors, why not call in American Blower, too? Contact our nearest branch office for preliminary technical data or write us for Bulletin 109.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

AMERICAN BLOWER

URCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

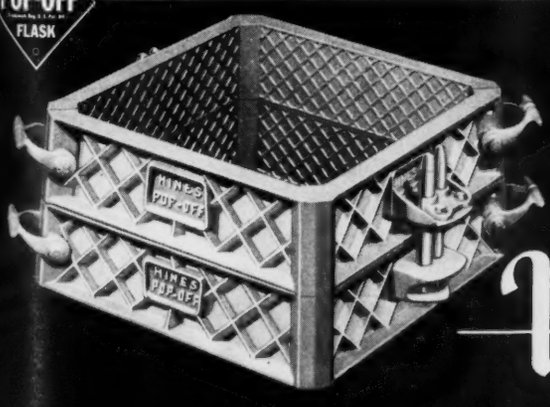

Chris

stmas

Stand fast therefore in the liberty
wherewith Christ hath made us free,
and be not entangled again with the
yoke of bondage.

—New Testament: Galatians, v, 1.

HINES POP-OFF FLASK



Hines Flasks

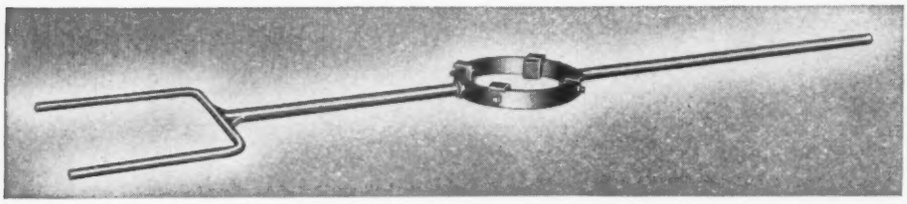
THE HINES FLASK CO., 3431 WEST 140TH STREET, CLEVELAND 11, OHIO

NO. 1 SOURCE FOR

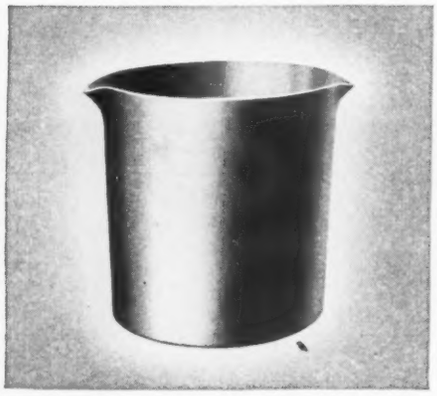
Bowls · Shanks · Tongs

Industrial Equipment round bottom pressed steel ladle bowl, 50 lb. capacity, type 7 flat side.

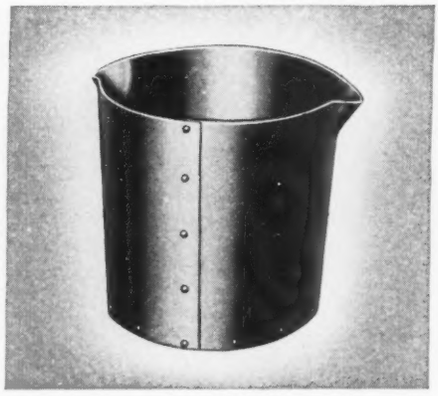
Industrial Equipment round bottom pressed steel ladle bowl, 60 lb. capacity, type 14 circular.



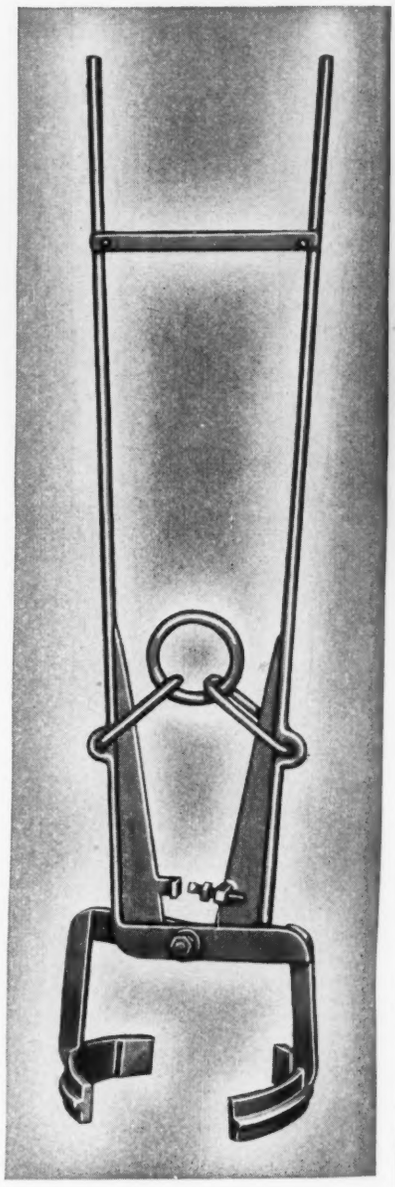
Industrial Equipment type 30CA single and adjustable ladle and crucible shank. Four-point suspension . . . easily adjustable . . . no springs . . . air cooled band. Fixed band types also available.



Industrial Equipment type 514 flat bottom welded steel ladle bowl. Available in almost any size or thickness.



Industrial Equipment 537 flat bottom riveted steel ladle bowl.



Type 72C crucible tongs. Adjustable. Four-point suspension. Claw types also available.

The above Industrial Equipment products, along with dozens of other types of bowls, shanks, tongs and ladles, are included in our latest catalog. *Write for your copy.*

LADLES

SHANKS

BOWLS

TONGS

Industrial
EQUIPMENT COMPANY
115 NORTH OHIO ST., MINSTER, OHIO

3 cost-cutting reasons

for using CRYSTOLON* wheels on gray iron

1. In Norton CRYSTOLON wheels you get an abrasive with just the right hardness and sharpness for fast, economical grinding on a low-tensile-strength material like gray iron.

2. There's a CRYSTOLON wheel that's exactly right for every cleaning room job you do. That goes for everything from swing-grinder work to bench stand — for heavy or light grinding pressure, large or small contact areas, high or low speeds.

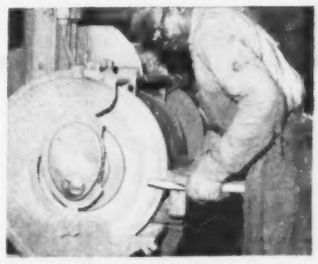
3. You can depend on CRYSTOLON wheels for consistent top performance—thanks to Norton's method of controlling grain spacing that assures uniform structure within wheels and from wheel to wheel.

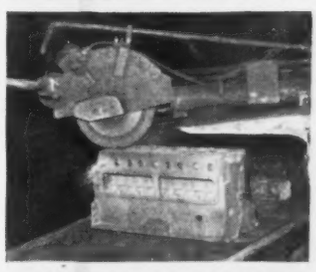
YOUR NORTON DISTRIBUTOR CAN HELP YOU

Besides his own practical experience in grinding applications, your Norton Distributor can always call in a Norton Abrasive Engineer. They will be glad to study your grinding jobs and make recommendations for more efficient, more economical cleaning room operation.

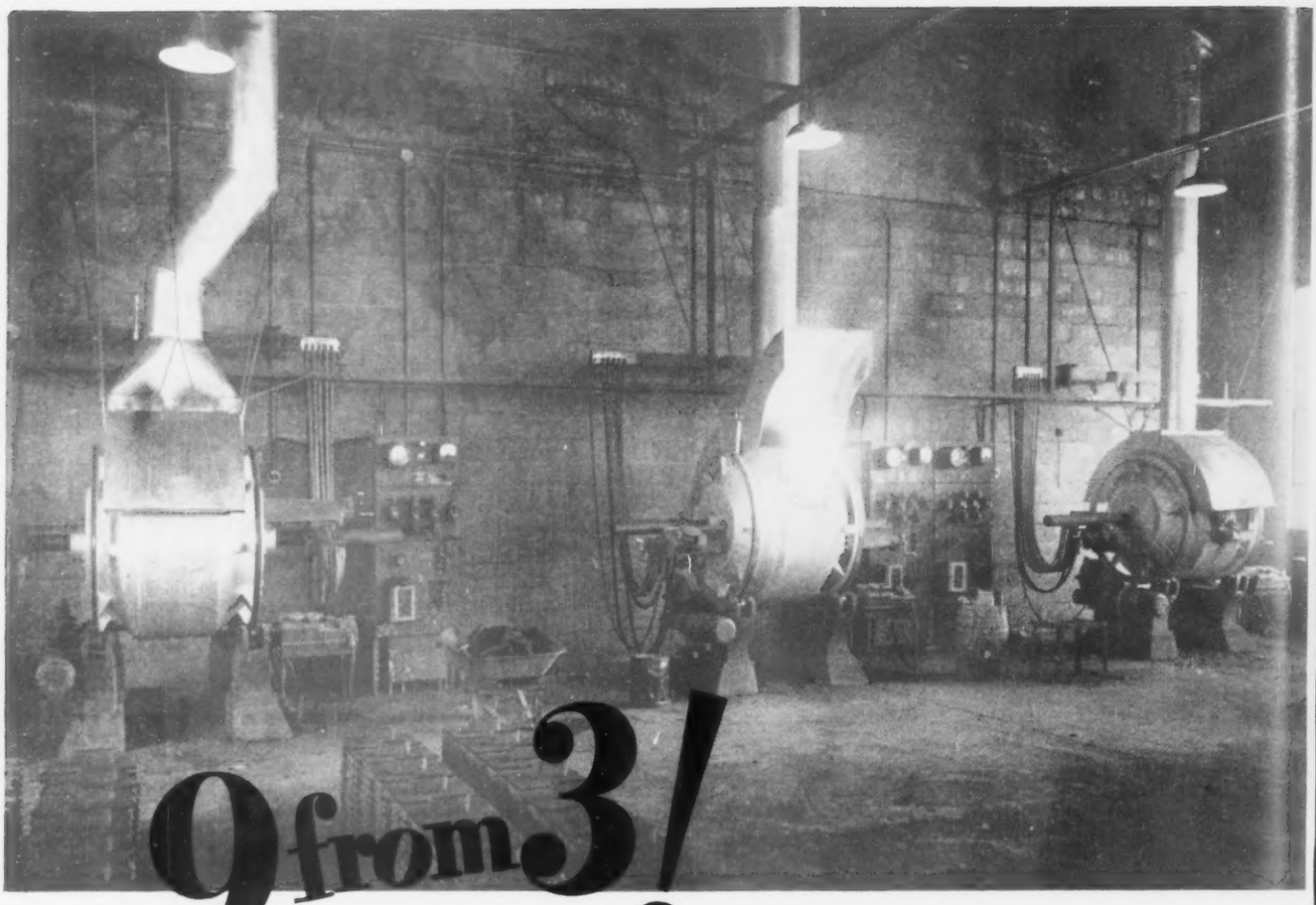
Many Money-Saving Tips on the grinding jobs you're doing right now are contained in this 54-page illustrated booklet. Ask your Norton Distributor for Booklet 1405, or write us direct. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Inc., Worcester 6, Massachusetts.

NORTON
ABRASIVES
Making better products to make other products better





*Trade-Mark Reg. U. S. Pat. Off. and Foreign Countries



9 from 3!

NINE TONS OF HIGH QUALITY IRON PER SHIFT FROM THESE 3 DETROIT ROCKING ELECTRIC FURNACES

Vassar Electroloy Products Company has based its growth on precisely controlled, quality iron and steel castings. In five years, metal melting requirements have increased more than 700%.

Today, three 700-lb. Detroit Rocking Electric Furnaces keep the pouring ladles full, producing alloys with exact metallurgical and physical characteristics melt after melt. The fast, efficient operation of these furnaces maintains high production levels and high standards of economy.

For melting ferrous or non-ferrous metals, these indirect arc furnaces have many advantages; easy, positive control; uniformity of melts; thorough mixture of elements through the melts; optimum use of power; less metal shrinkage; more heats per day; easy shell replacement.

Furnaces are available in 10 to 4,000 lbs. capacity, designed specifically to fit your electrical specifications. Get full information. Write today!

Tapping a heat of alloy steel from Detroit Rocking Electric Furnace at Vassar Electroloy Products Co. Furnace is Type LFY, 700 lb., 175 Kw.

DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN

Foreign Representatives: in BRAZIL—Equipamentos Industrias, "Eisa" Ltd., Sao Paulo; CHILE, ARGENTINA, PERU and VENEZUELA: M. Castellvi Inc., 150 Broadway, New York 7, N. Y.; MEXICO: Cia Proveedora de Industrias, Atenas 32-13, Apartado 27A3, Mexico 6, D. F., Mexico; EUROPE, ENGLAND: Birlec, Ltd., Birmingham.

THRU-THE-AIR
"EXPRESS" HANDLING IN YOUR PLANT
for loads up to 15 tons

Never any delay the Trav-Lift handling way! Heavy loads move up and *over* floor congestion . . . transported by *one* man anywhere in the entire area of crane service. And all without rehandling!

The P&H Trav-Lift crane gives you precision handling at *lasting* low cost. It's custom built to your needs from money-saving standard designs . . . with various spans and lifting speeds and a choice of cage or floor push-button control. If your requirements demand intermittent crane service, then you need the Trav-Lift . . . built only by P&H, consistent leader in the field of overhead handling equipment. Call a P&H materials handling engineer. You'll be helped *more* by his specialized experience.

handle it "thru-the-air" at lower cost

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

4400 West National Avenue, Milwaukee 46, Wisconsin

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FABRICATED HOMES

Bill—

you can cut drying time with Mogul!

LARGEST SELLER IN THE FIELD!

Kordek, the preferred dry bond for cores . . .

• MAKES SMOOTHER CORES • CUTS DOWN DISCARDS

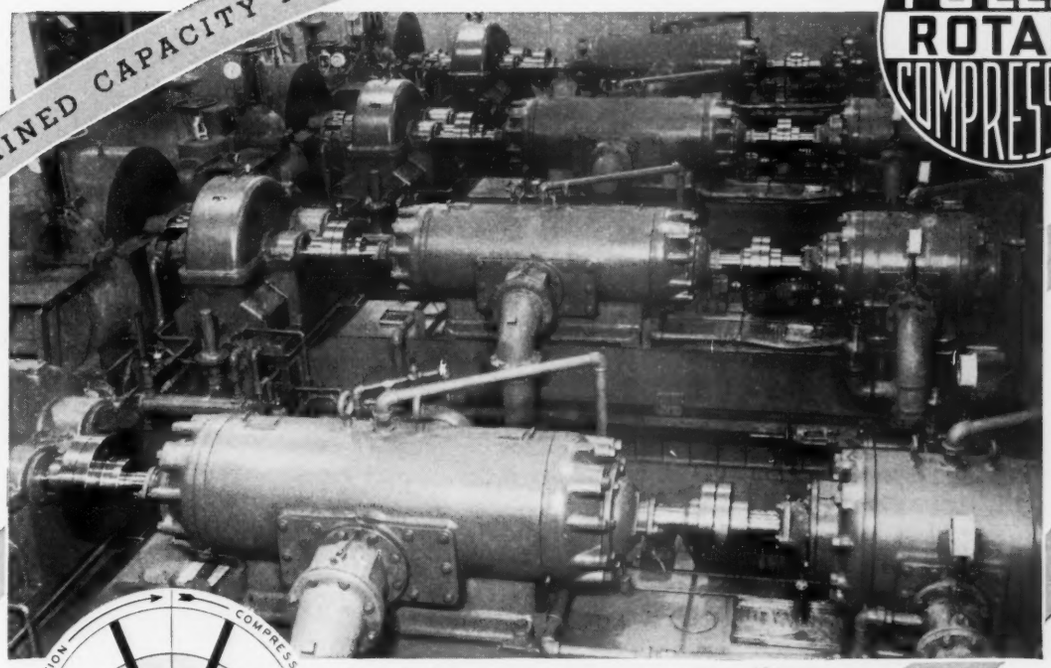
Full technical service, without obligation, is available to show how you can profit from the use of MOGUL® Cereal Binder in your production.

Write Technical Sales Department

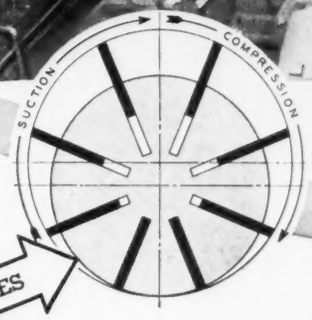
CORN PRODUCTS REFINING COMPANY • 17 BATTERY PLACE, N. Y. 4, N. Y.

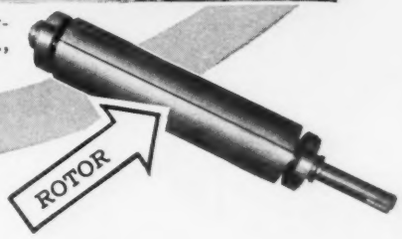
MAINTAINED CAPACITY FOR THE LIFE OF THE MACHINE

FULLER ROTARY COMPRESSORS



Four Fuller Rotary Compressors, turbine driven, total capacity 6760 c.f.m., 110-lb. p.s.i.





Due to design and construction, the blades of a Fuller Rotary Compressor automatically compensate for wear, thus eliminating loss of capacity. *Maintained capacity* is just one of the many outstanding features of the Fuller Rotary.

The fewer moving parts that make up any piece of equipment, the more continuous service at the lowest operating cost. Fuller Rotary Compressors are an outstanding example of simplicity . . . few moving parts—rotor, bearings, blades.

There is no adjustment of valves, no grinding of seats, no bearing take-up . . . moving parts are reduced to the minimum, all of which means fewer shut-downs, with less costly maintenance charges. Shut-downs are costly . . . lost time can never be recovered. Install Fuller Rotaries for day in and day out, continuous service.

Fullers are built for capacities to 3300 c.f.m. actual free-air delivery, 125-lb. pressure. Write for Bulletin C-6, illustrating and describing the design and construction of this modern compressor.

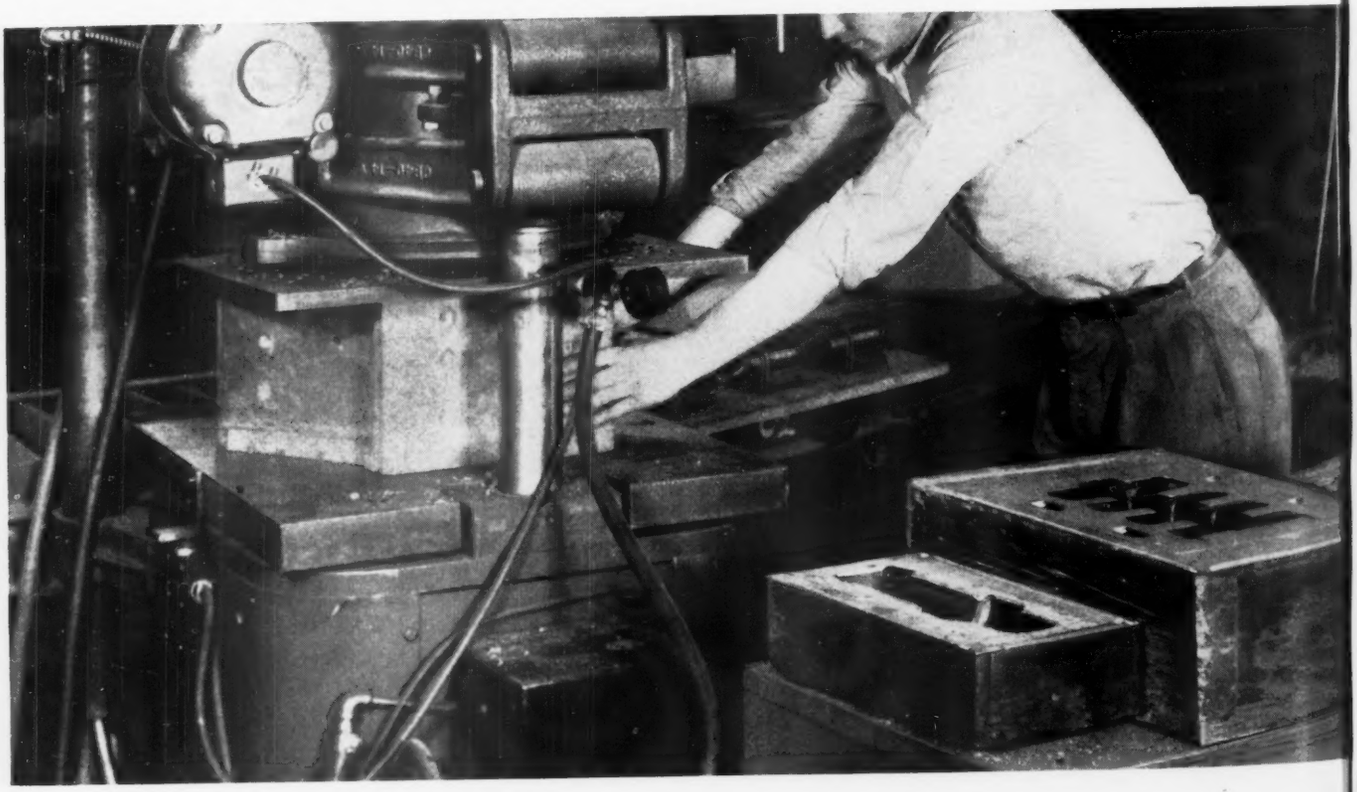
FULLER COMPANY, Catasauqua, Pa.
120 So. LaSalle St.—Chicago 3
420 Chancery Bldg.—San Francisco 4

C-229

Fuller

PIONEERS OF HIGH-EFFICIENCY VANE-TYPE ROTARY COMPRESSORS

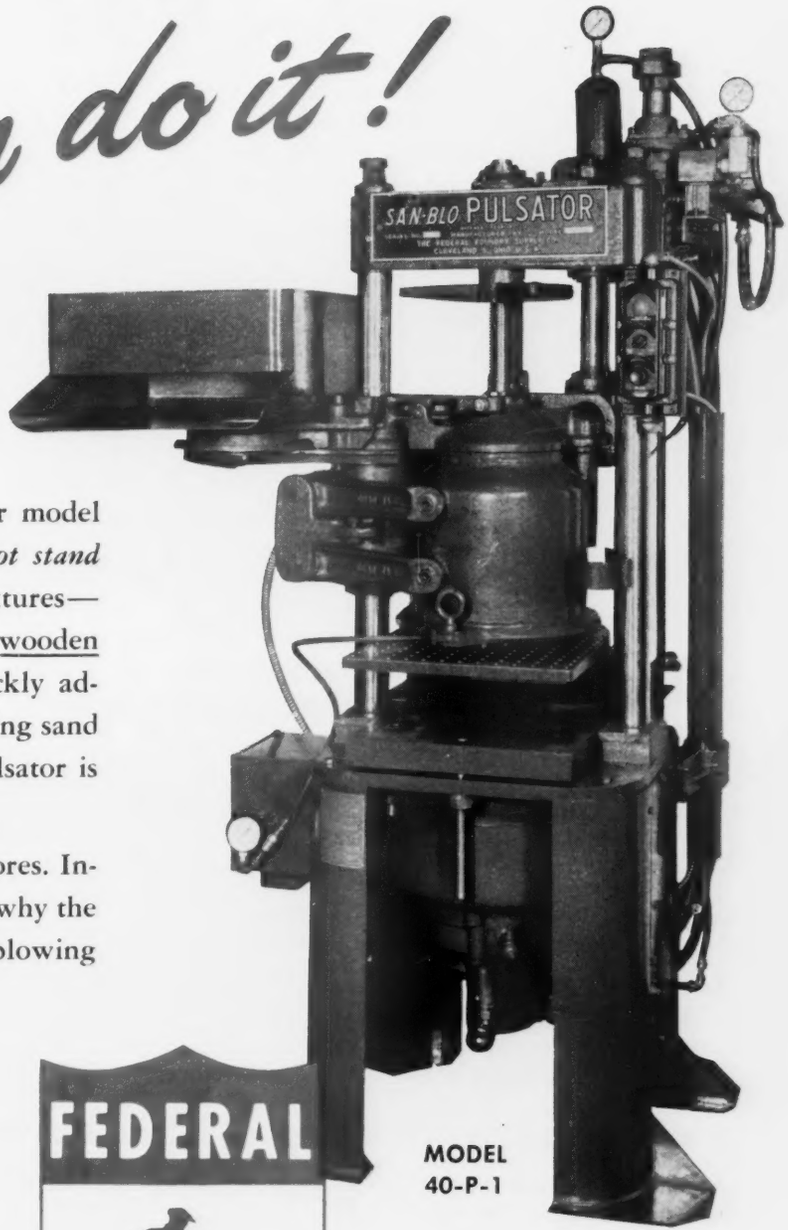
It costs you money to make cores by hand.



when a machine could be blowing them, and.

. . . . . here's *the* core blower

that can do it!



There are no *handcuffs* on the Pulsator model SAN-BLO! It's built to blow cores—*not stand idle!* It will blow all your core sand mixtures—not just some of them. It will blow your wooden core boxes—not just metal boxes. Quickly adjusted to core boxes. No time lost changing sand magazines or blow plates. And—the Pulsator is easy, safe and clean to operate.

So, don't ever think you can't blow cores. Investigate this new core blower and learn why the Pulsator does away with the many core blowing limitations you've been used to.

Remember, to turn core *making* into core *production*—it's the SAN-BLO Pulsator—the *all-purpose* core blower.

For complete information, write for Catalog P-1.

FEDERAL

MODEL 40-P-1

. . . for cores weighing up to 40 lbs. each—for metal and wood boxes—6" draw table standard equipment. Other models available for cores weighing up to 250 lbs. —choice of automatic controls.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION INC. MEMBER FEMA

The **FEDERAL FOUNDRY SUPPLY** *Company*

4600 EAST 71st STREET, CLEVELAND 5, OHIO

SALES OFFICES: NEW YORK · CLEVELAND · DETROIT · MILWAUKEE · LOS ANGELES

DRAVO *Counterflo* HEATERS

have a certified High Standard of Safety!

LISTED UNDER UNDERWRITERS' LABORATORIES, INC. REEXAMINATION SERVICE — UL

ALL STANDARD MODELS, BOTH GAS-FIRED AND OIL-FIRED, LISTED BY UNDERWRITERS' LABORATORIES, INC.

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

ALL GAS-FIRED STANDARD MODELS APPROVED BY AMERICAN GAS ASSOCIATION.

plus—

ACCEPTANCE BY FACTORY MUTUAL ENGINEERING DIVISION OF DRAVO STANDARDIZED SAFETY CONTROL CIRCUIT.

DRAVO HEATER SAFETY MEANS SAVINGS FOR YOU

Because they have this safety approval, you'll find you can obtain the lowest-possible insurance rates with Dravo *Counterflo* Heaters. These savings represent only part of the many savings you get with Dravo warm-air Heaters. For instance:

DRAVO HEATERS OFFER YOU . . .

- low initial cost . . . savings up to 60% on installation
- concentration of heat at working levels
- 150-foot air throw . . . no duct work required
- flexibility . . . units can be mounted in any position on floor, wall or ceiling
- automatic operation . . . on-off or modulating controls
- long service life . . . low maintenance . . . stainless steel combustion chamber eliminates refractory lining
- mobility . . . can be moved easily to any location
- low fuel consumption . . . direct-fired . . . burns gas or oil . . . readily converted

DRAVO HEATERS HAVE MANY USES . . .

These versatile heaters are ideal for commercial and industrial use in foundries . . . warehouses . . . machine shops . . . stores . . . schools . . . churches . . . process industries . . . and many others. Why not look into the possibilities of Dravo Heaters for your heating and ventilating needs? Write today for Bulletin No. QR- 6

DRAVO CORPORATION

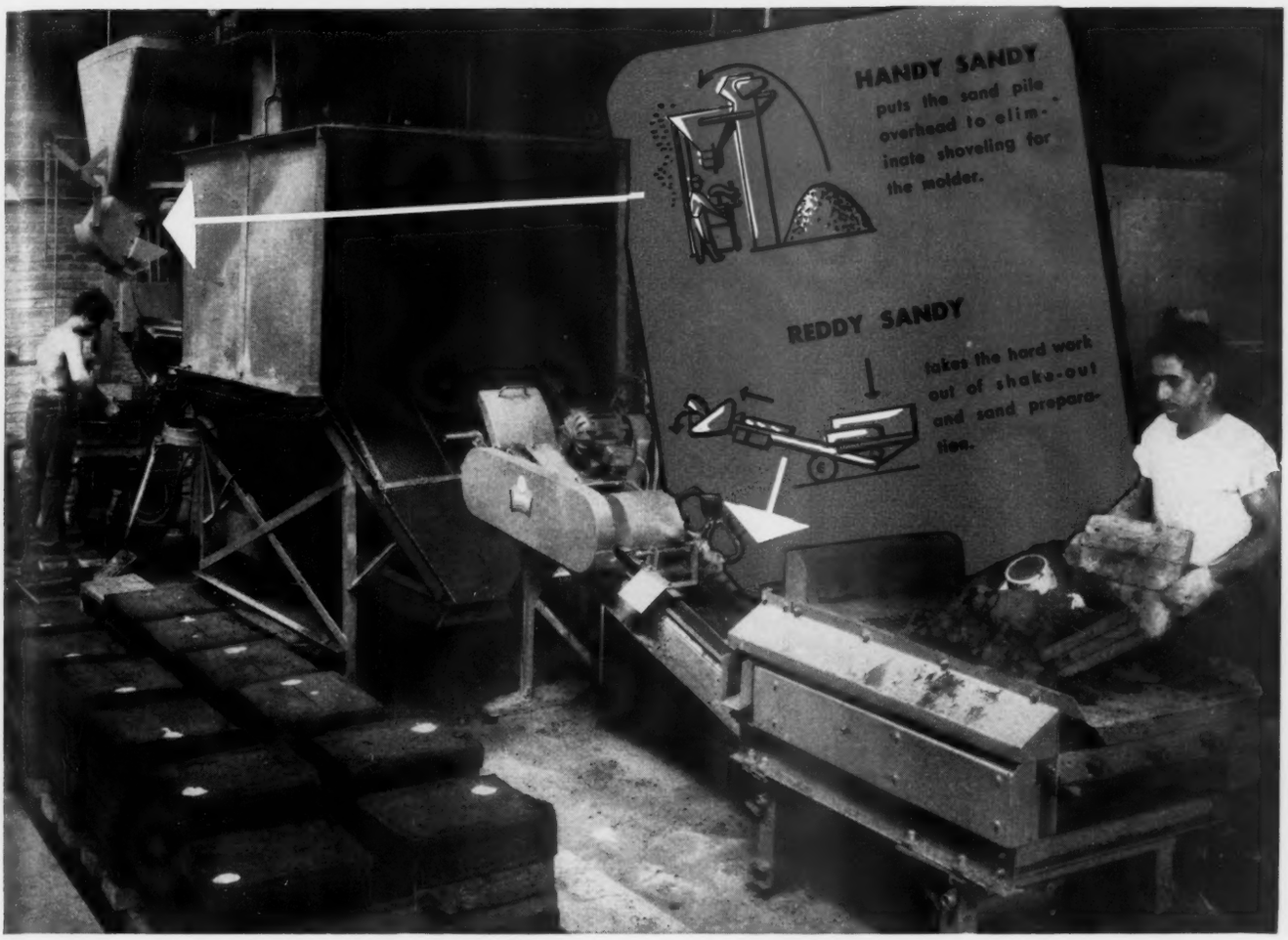
HEATING DEPARTMENT
Dravo Bldg., Fifth & Liberty Ave.
PITTSBURGH 22, PA.

ATLANTA • BOSTON • CHICAGO • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH
Sales Representatives in Principal Cities

DRAVO

Manufactured and sold in Canada by Marine Industries, Ltd., Sorel, Quebec

Export Associates: Lynch, Wilde & Co., Washington 9, D. C.


HANDY SANDY
puts the sand pile overhead to eliminate shoveling for the molder.
REDDY SANDY
takes the hard work out of shake-out and sand preparation.

How Stemac, Inc. makes more molds with . . .*

. . . HALF THE LABOR

How much more are *you* paying than is necessary for shake-out, sand preparation and molding? The extra cost you pay for slower methods adds nothing to the value of your castings. It can only be written off as added expense. Why not save this money as Stemac, Inc. did by installing Reddy Sandy and Handy Sandy automatic sand preparing and handling equipment.

According to Mr. Alfred Hesse, Vice-President, "Stemac, Inc., Chicago,* Illinois has experienced a substantial increase in production while at the same time reducing foundry labor costs in the manufacturing of aluminum and brass sand castings for captive and jobbing purposes.

"The amount of labor required to shake out, condition sand, and perform the miscellaneous tasks necessary for efficient foundry operation has been reduced by approximately 50% when Handy Sandy and Reddy Sandy equipment is used.

"The rigid surface requirements demanded for our electrical fittings and lamps and for our jobbing sand castings necessitates the use of properly controlled and conditioned sand. The Handy Sandy and Reddy Sandy equipment enable us to achieve these requirements with a minimum of foundry labor."

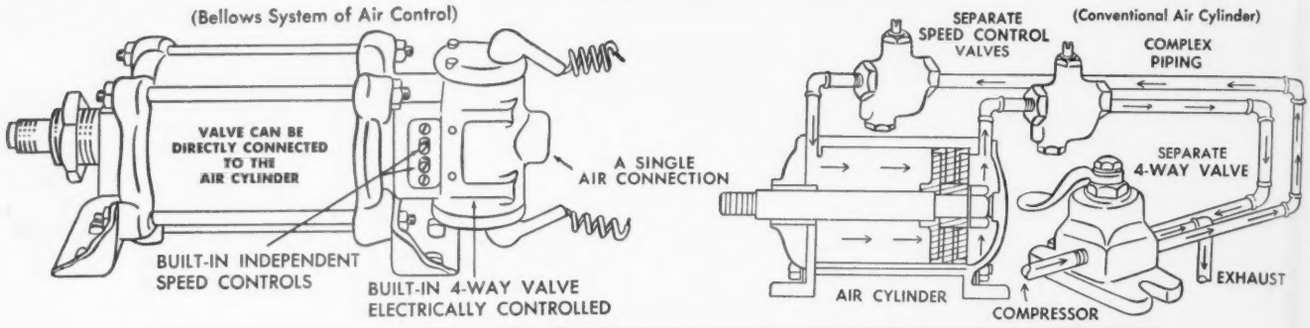
Take the first step to lower foundry costs. Send for your copy of the new catalog: "Planned Mechanization for Foundries." It shows how Handy Sandy and Reddy Sandy equipment can make important savings for you.

NEWAYGO ENGINEERING COMPANY

newaygo, michigan

Manufacturers of Neway® Mold Handling, Sand Handling and Conditioning Equipment

Air control system designs being changed by success of low voltage solenoid "triggers"

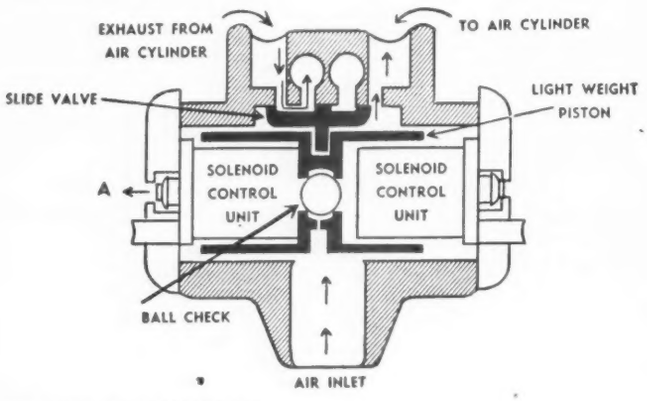


COMPARE EFFICIENT AND COMPACT BELLOWS AIR CONTROL SYSTEM WITH CONVENTIONAL METHOD

The development by The Bellows Company of a low voltage electrically controlled air valve has resulted in major design changes in equipment using air operated movements. The Bellows Electroaire valve, hardly as big as a package of king size cigarettes, does the job of power solenoid operated valves ten to twelve times its size.

The Bellows Electroaire Valve uses the air it controls to do the actual work of shifting the valve. The tiny 8-volt solenoids serve merely as "triggers" to release and direct the full force of the incoming high pressure air.

As shown in the illustration below, when high pressure air enters the valve, it fills the entire valve chest, exerting equal pressure on both ends of the small stainless steel piston. A momentary electric current sent to one of the two sealed solenoid control units draws the plunger away from the end cap for a fraction of a second, permitting high pressure air to escape to the outside. The check ball is drawn tightly against its seat. All of the incoming high pressure air on the opposite side is thus directed against one side of the small piston, shifting the valve. Energizing the opposite solenoid control unit reverses the valve.



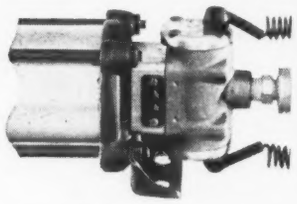
WHY THE LOW VOLTAGE?

Since the incoming air pressure does the work of shifting the valve, only a small amount of energy is required to move the solenoid plungers. 8 volts prove ample. Since the electrical contact is only momentary, and since the solenoid control units are located in the air stream, a natural coolant, heat is not a problem. In fact, the solenoid control units are guaranteed against burnout.

The low voltage simplifies wiring, does away with the necessity of expensive and bulky conduit, terminal blocks, and relays; and low voltage provides assured electrical safety for operator and machine.

BUILT IN SPEED CONTROLS MAKE THE ELECTROAIRE VALVE A COMPLETE "PACKAGED" AIR CONTROL UNIT

In conventional air cylinder practice, control of piston rod speed can only be obtained by inserting separate speed control valves in the air lines leading from the two cylinder ports to the remote air control valve. In the Electroaire valve two independent speed control regulators are built right into the valve itself, thus not only eliminating the extra valves but the extra piping as well. The Electroaire Valve is fast — will operate at speeds in excess of 2000 movements a minute, far beyond the capacity of any air cylinder with which it may be used.



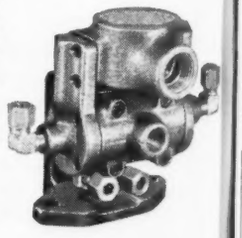
STANDARD AS A BUILT-IN FEATURE ON ALL BELLOWS BEM AIR MOTORS OR AS A SEPARATE AIR CONTROL FOR ALL MAKES OF STANDARD AIR CYLINDERS

The Electroaire Valve is standard equipment on all Bellows Air Motors and other Bellows "Controlled-Air-Power" Devices arranged for electrical control. It is also available with an adapter mounting bracket for use with any standard air cylinder of suitable capacity. Three port sizes, ¼", ⅜" and ½" cover air cylinder bores from 1" to 4½".

PROVED IN OVER 60,000 INSTALLATIONS

More than 100,000 Electroaire Valves are now in use in more than 60,000 separate installations. Many Electroaire valves have established operating records of twenty to thirty million cycles without maintenance of any kind.

"EXPLOSION-PROOF" MODELS PERMIT SAFE USE OF ELECTRICALLY-CONTROLLED AIR POWER IN HAZARDOUS LOCATIONS



The "explosion-proof" Model of the Electroaire Valve meets fully requirements of the National Wiring Code of The National Board of Fire Underwriters for wiring in hazardous locations. All electrical connections are fully enclosed in a sealed cast bronze housing.

MAY WE SEND YOU THIS GROUP OF CASE HISTORIES

showing typical installations of The Bellows Electroaire Valve? Photographs, wiring diagrams, cost and production data. Free on request. Write Dept. FO 1252, The Bellows Co., Akron 9, Ohio.

The Bellows Co.

AKRON 9, OHIO

1388

Grand Haven cures a wide variety of sand cores electronically . . . finds that improved core quality reduces casting rejects.

"Cuts core-baking cost 46% ...saves over $7,000 a year"

SINCE replacing conventional ovens with THERMEX® Core-baking Equipment, the Grand Haven Brass Foundry, Grand Haven, Michigan, reports a drastic cut in core-baking costs. A detailed comparison of old and new methods shows these results:

	Old Method	With Thermex Core-Baking Equipment
LABOR COST per 1000 lbs. of cores	$19.82	$ 6.29
OTHER COSTS per 1000 lbs. of cores (Floor space . . Sand and Binders . . Utilities . . Maintenance . . Rejects)	$12.19	$10.84
TOTAL COST per 1000 lbs.	$32.01	$17.13

This amounts to a saving of 46% or more than $7,000 per year.

Management at Grand Haven follows a progressive policy of providing for a continual growth in production volume. Even running at half capacity, the THERMEX Core-baking Equipment is already producing more than the equipment it replaced, and the production rate can be *doubled* without adding further capacity, or using more floor space. Also, with a growth in output, the savings will increase.

Take advantage now of this cost-cutting equipment. A THERMEX field engineer will be glad to show you detailed studies of installations like this, which give complete cost data. Write The Girdler Corp., Thermex Division, Louisville 1, Kentucky.

Partial List of Companies Who Have Purchased Thermex Electronic Core-Baking Equipment

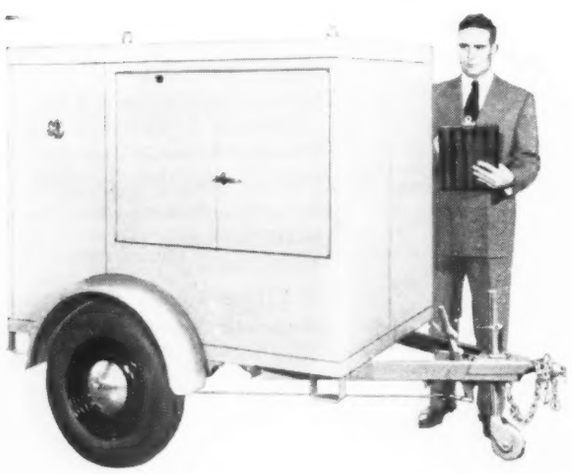
- Albert Lea Foundry Co.
- American Brake Shoe Company
- American Hardware Corporation
- Atlantic Steel Castings Co.
- Brugger Mfg. Company
- James B. Clow & Sons
- Crane Company
- Drake Non-Clinkering Furnace Block Co., Inc.
- Ford Motor Company
- Fundicao Tupy
- Grand Haven Brass Foundry
- Grinnell Corporation
- International Harvester Co., Ltd.
- Moline Malleable Iron Company
- Mueller Company
- National Malleable & Steel Castings Company
- Ontario Malleable Iron Co., Ltd.
- Phoenix Brass Fittings Corp.
- Rolle Manufacturing Co., Inc.
- Ronci Company, Inc.
- Sterling-Faucet Company
- U. S. Pipe & Foundry Company
- Walworth Company

the **GIRDLER** Corporation

THERMEX DIVISION

NOW — a *truly* portable industrial x-ray unit!
The General Electric RESOTRON 250

Compact, lightweight, 250,000-volt x-ray unit speeds inspection of large structures, saves many hours of set-up time



For radiographic examination of welds or castings in large structures, the new GE Resotron 250 offers unprecedented advantages. Completely housed in a cabinet only 4 x 6 x 4-foot high, which may be trailer-mounted, this unit can be set up anywhere in a few minutes by one or two men.

Small, lightweight tube head can be passed through a 15-inch diameter opening for interior inspection of large vessels. It's particularly adapted for ship hulls, pressure vessels, steam pipes. No cranes or elaborate rigging needed — can be manipulated manually.

Resotron 250 is the latest addition to the complete GE line of industrial x-ray apparatus . . . ranging up to 2,000,000-volt units and betatrons. It is actually a miniature of the famous General Electric million-volt Resotrons, with such time-proven features as resonant transformer, cascade tube and gas insulation.

Have you inspection problems the Resotron 250 might solve? See your local GE x-ray representative. Or write X-Ray Department, General Electric Company, Milwaukee 1, Wis., Rm YY-12.

GENERAL ELECTRIC

DUPLICAST

TRADE MARK REGISTERED

"The Expendable Core Box"

Eliminates FINS *in Castings*

PLUS THESE 5 ADDITIONAL ADVANTAGES . . .

1. Duplicast saves you up to 80% on core box replacement costs.
2. Extra Duplicast core boxes are on hand at all times — no production delays.
3. No sampling or checking is necessary when a new core box is put in production.
4. Duplicast means a substantial reduction in scrap.
5. There is an increase in core production over cast iron boxes formerly used.

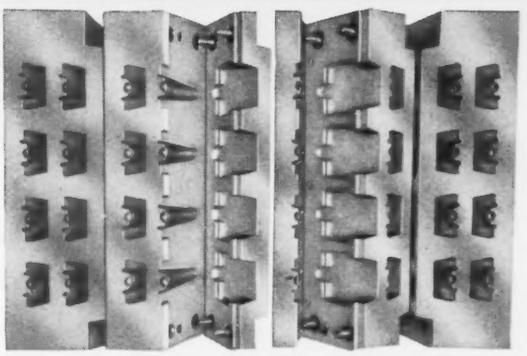
Every DUPLICAST* Core Box Is An *EXACT* Duplicate

The principle of Duplicast core boxes and the method of their manufacture GUARANTEES that the cavities are always EXACTLY duplicated. Because of this accuracy and because with Duplicast, "the expendable core box," it is cheaper to replace than repair a core box, it is never necessary to produce castings from worn or repaired cavities. This means smoother, cleaner, better castings — without fins. Castings produced with Duplicast core boxes are quality castings during the entire run.

This is another of the many advantages of Duplicast. An increasing number of users are discovering that Duplicast features add up to greater profits. Why don't you investigate Duplicast, now?

. . . PROVED IN PRODUCTION — COAST TO COAST!

* Duplicast is the ideal core box for high production schedules and for complicated irregular contoured shapes and cavities which otherwise are costly to replace or repair. Duplicast core boxes are made of a wear resistant aluminum alloy by a patented method in which a permanent hob, or mandrel, is used to duplicate any number of core boxes of exact dimensions within plus or minus .003 inches within a distance of 12 inches. Every Duplicast core box is produced with a mirror-like finish in the cavities without hand finishing or tooling of any kind.



FOR MORE DETAILS — MAIL COUPON TODAY

Industrial Pattern Works
2625 Belmont Avenue—Chicago 18, Ill.

Gentlemen: I am interested in Duplicast and would like further information.

☐ Send Bulletin D-1. ☐ Have representative call.

Name_____ Title_____

Company_____

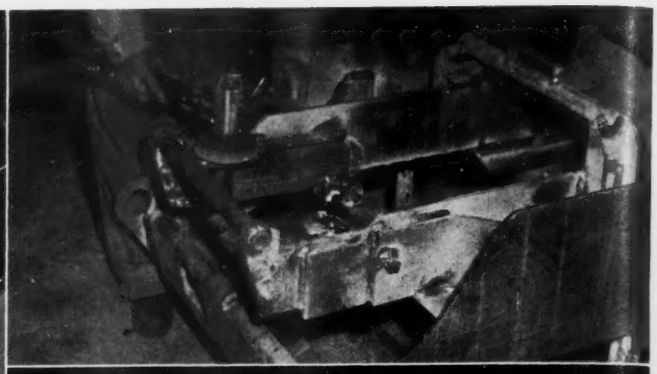
Address_____

City_____ State_____

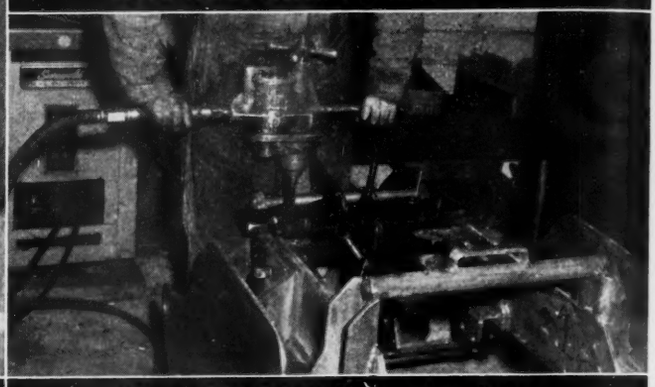
INDUSTRIAL PATTERN WORKS

2625 W. Belmont Ave. • Chicago 18, Illinois

Cleco B-1 Scaler removing weld scale from part of a power shovel frame.



Cleco 1460-A Grinder on industrial truck frame assembly line.



Cleco 103-AR Drill reaming holes in industrial truck frame.

COST RECORDS SHOW CLECO AIR TOOLS REQUIRE LESS MAINTENANCE

A progressive Ohio welding company has developed a carefully planned air tool maintenance and repair program that helps keep costs down.

One feature of this program is that it gives management accurate maintenance cost figures on air tools.

These cost figures have shown—to the company's satisfaction—that maintenance of Cleco Air Tools is at a minimum.

We would appreciate the opportunity of proving to *you* the low maintenance on Cleco Air Tools. Call, write or wire the nearest Cleco office listed below.

CLECO AIR TOOLS

PNEUMATIC EQUIPMENT DALLET ACCESSORIES

CLECO DIVISION

of the REED ROLLER BIT COMPANY, 5125 Clinton Drive, Houston 20, Texas, U.S.A.

DIVISION OFFICES

GEORGIA: Atlanta 3, 502 Peters Bldg. • **OHIO:** Cincinnati 2, 729 Temple Bar Bldg. • **MASSACHUSETTS:** Worcester, 23 Enfield Street
MISSOURI: St. Louis 3, 2322 Locust St. • **ILLINOIS:** Chicago, 5701 West Madison St. • **MARYLAND:** Baltimore 20, 39D Oak Grove Drive
TEXAS: Fort Worth, 1717 East Presidio • **MICHIGAN:** Detroit, 18071 Wyoming Ave. • **CALIFORNIA:** Los Angeles, 1317 Esperanza Street
NEW JERSEY: Newark 4, 75 Lock St. • **PENNSYLVANIA:** Philadelphia 20, 5220 N. Fifth St. . . . Pittsburgh: Room 621, Highland Bldg.

In Canada: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Toronto (Leaside), Ontario
DISTRIBUTORS IN PRINCIPAL CITIES OF THE UNITED STATES AND THROUGHOUT THE WORLD

3420

Linbond

CORE OIL

NO. 742

AQUA-SET

A SYNTHETIC CORE BINDER

"L"

The Iron Lion Head reproduced in our ad is shown through the courtesy of the Detroit Institute of Arts. It dates from the T'ang Dynasty, A.D. 618-907. We will be glad to furnish a detailed description of this grand old work of art if you write us.

The art of ages long past is built into our present use of Iron. A long road with many turnings has led to our present skills and now, although some of our castings may seem as frightening as the Chinese Lion when they are machined or x-rayed, we know how to deal with each defect.

One way of course is through the use of Linbond Core Oil—a tool which every master craftsman working in iron is proud to use. It gets him out of tight places, gives him cores that are firm and hard, and that deliver good castings endlessly at the shake-out.

Some foundries have outgrown their ovens and really need speed in baking. Aqua-set is the answer for these plants. It is a resin type binder which bakes out to a finish, minutes after cores have been dried of moisture, or you can use oil and resin binders in the same sand mix and get surprising speed for the bake. This combination can build up a hard surface and tends to protect firm sharp edges on the cores.

Write us for folders on Linbond and Aqua-set. We will send suggestions also for combination mixes.

UNITED OIL MFG. COMPANY

1429 WALNUT STREET, ERIE, PA.

Jenny doesn't live here any more!

YES, in the modern coal mine there's no room for Jenny. Today her job is done by powerful electric locomotives capable of pulling 50 times the load Jenny used to haul to the mine surface.

As a matter of fact, in the modern mine even the traditional pick and shovel are as out-of-place as Jenny herself! More than 90% of *bituminous* coal is now mechanically cut, and over 70% is mechanically loaded. Result: more economical coal to light the way, fuel the fires, power the progress of America.

But, basically, what caused Jenny to disappear? What's behind American industry's evermore efficient machines that turn out goods at lower cost—thus making them available to more people? One word tells the story—COMPETITION.

In the coal industry there are 5,000 privately managed coal companies competing with one another and all competing in the market with other fuels. When one coal company develops more efficient mining methods, the rest can keep pace only by striving to improve even further. No wonder that with his modern machines, developed through competition, the American miner's daily output is 4 to 24 times that of any miner in Europe or Asia—most of whom work in government-controlled coal industries.

Just as competition spurs *you* on to trying harder—it's competition that goads the individual company to deliver products that will outsell others. And it's competition that keeps a whole industry on its toes, cutting distribution costs, opening up new outlets, and delivering better products.

Competition—not government control—has already made America the most productive nation on earth. Competition—not regimentation—points the way to ever greater plenty for all of us.

★ ★ ★

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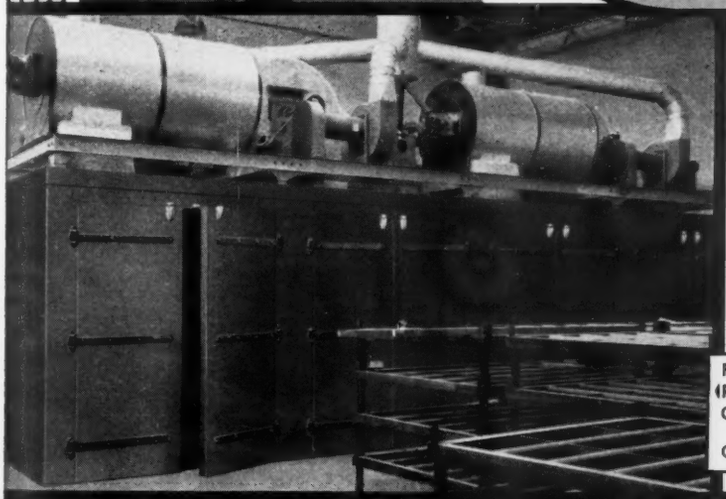
THE COMPETITIVE SYSTEM DELIVERS THE MOST TO THE GREATEST NUMBER OF PEOPLE

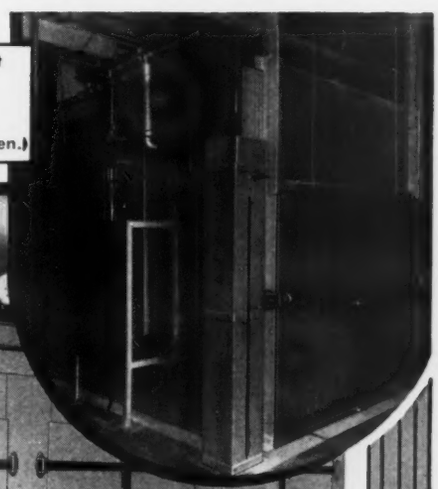
Two Compartment Car Type Mold Drying Oven.
Two Compartment Rack Type Core Oven.
Single Compartment Rack Type Core Oven.
LANLY
FOUNDRY OVENS
THE LANLY COMPANY • 780 PROSPECT AVE
CLEVELAND, OHIO



The Lanly reputation has been established as the result of the consistent incorporation of advanced, efficient design and high grade construction into every Lanly installation.

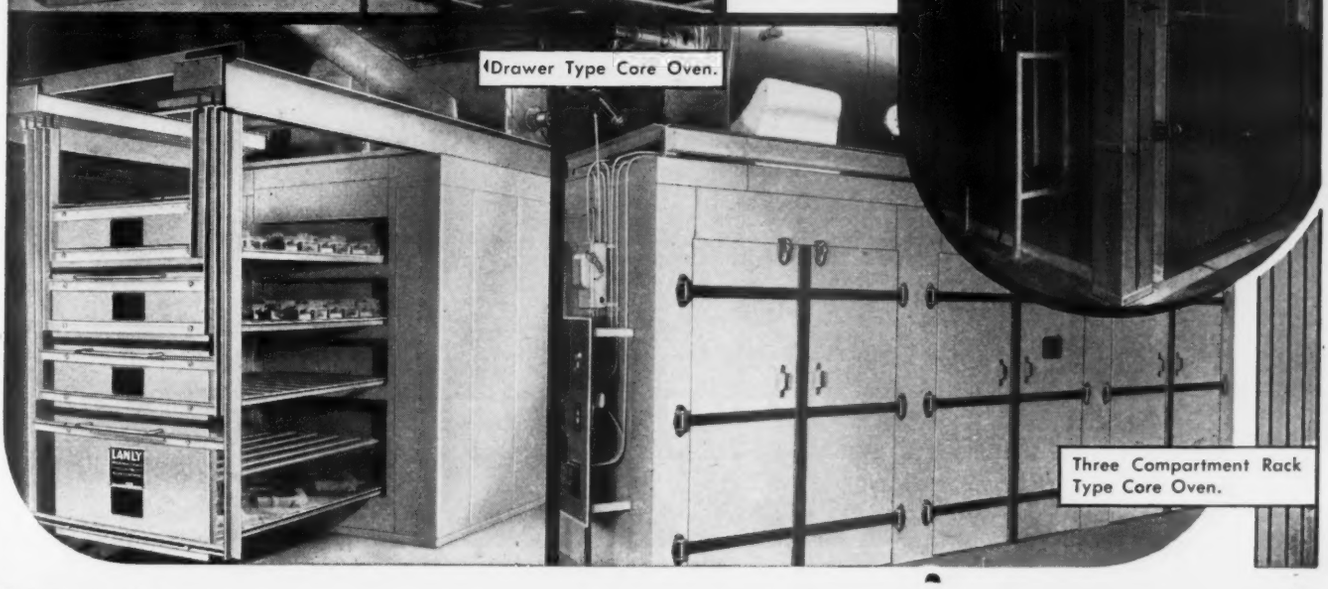
Core baking, pasting and mold drying ovens as well as casting conditioning and heat-treating ovens are available in standard units.

Write for Literature and Complete Information.



Four Compartment Rack Type Core Oven.

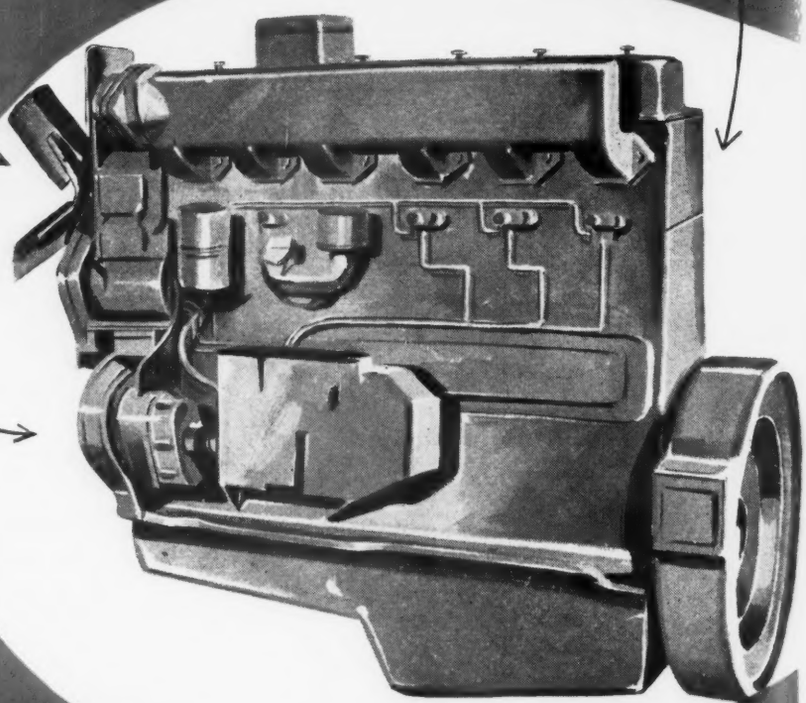
Car Type Core Oven.



Drawer Type Core Oven.

Three Compartment Rack Type Core Oven.

Protection by TOUSEY!



THE interiors of powerful diesel engines are protected by Tousey Casting Sealers. These sealers effectively cover any slight imperfections in the castings or minute leavings of sand or dirt, they resist hot oil, abrasion and extreme changes in temperature. They provide a non-bleeding base for exterior finishes. ★ Tousey has been producing quality sealers, paints, varnishes and lacquers for leading industrial manufacturers for more than 65 years.

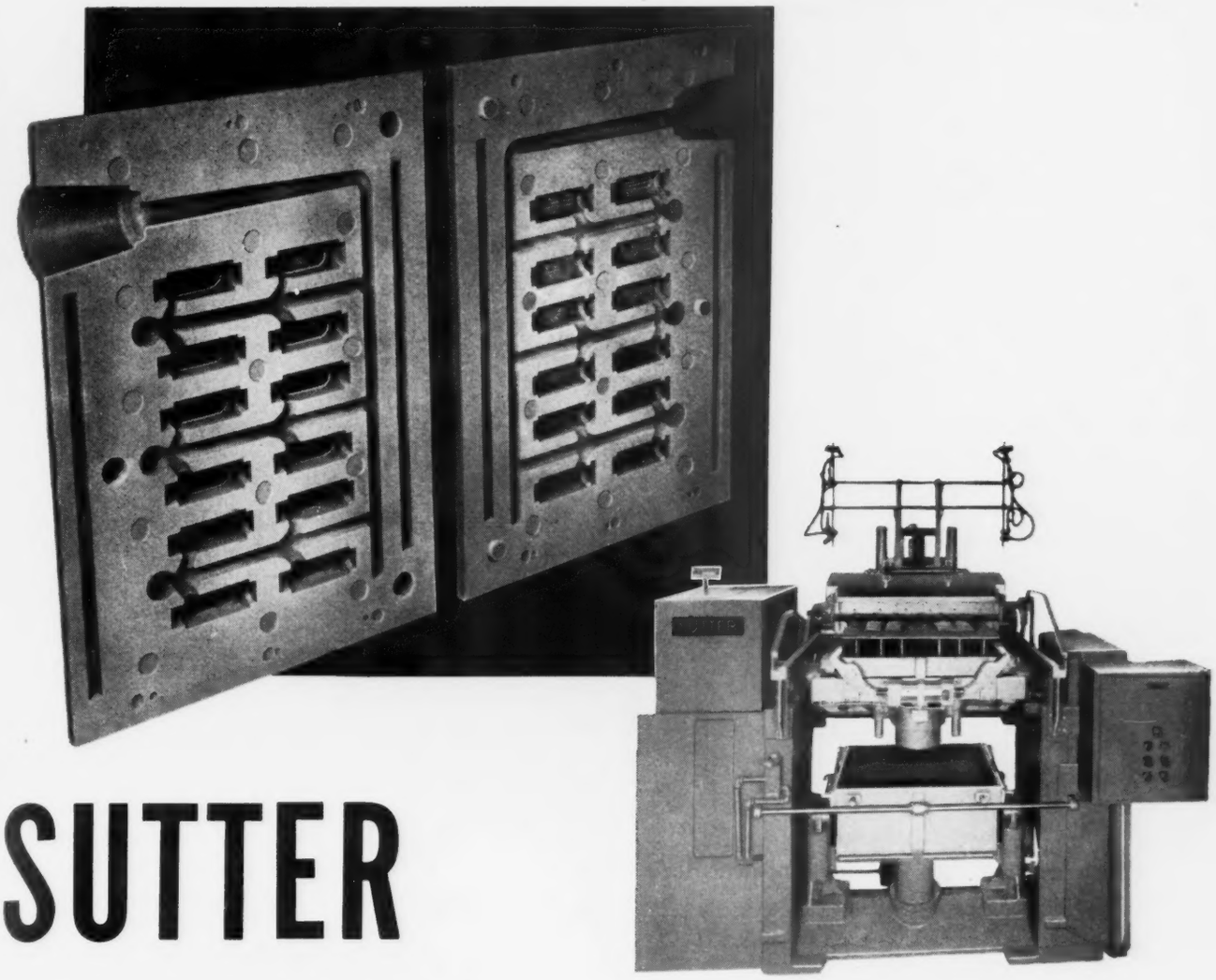
TOUSEY PRODUCTS

CASTING SEALER

THE TOUSEY VARNISH COMPANY

520 WEST 25TH STREET • CHICAGO 16, ILLINOIS

MAKE UP TO 60 OF THESE MOLDS PER HOUR



SUTTER

AUTOMATIC SHELL MOLDING MACHINES

SEND FOR BULLETIN S

This illustrated bulletin gives complete information on operation and construction of Sutter Shell Molding Machines. Send for yours today. There is no charge or obligation.

The amazing economies of completely automatic shell molding for production foundries today is a practical reality.

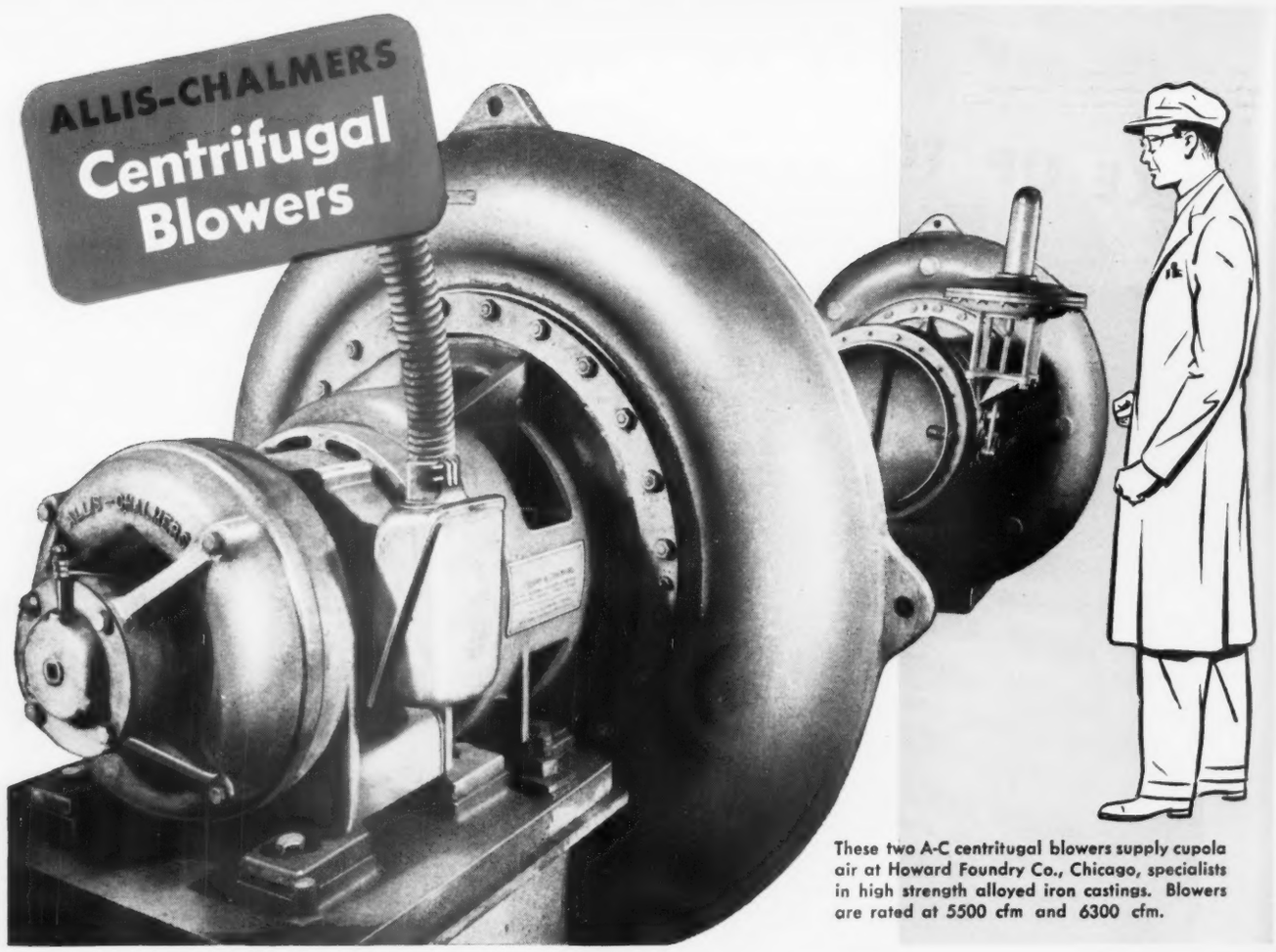
Sutter Shell Molding machines, featuring a completely automatic cycle, can produce up to 60 shell molds per hour per machine. And this can be accomplished with unskilled labor!

Quality shell production is maintained because of the elimination of the human element in this new method of mold production. Any operator of the Sutter Shell Molder needs only to push the starter button, remove completed shells, and occasionally load the ample resin bin of the machine. This means a tremendous saving in labor costs. Furthermore one operator can handle two machines with ease—result: production of 180 shells per hour by one operator!

These are but a few reasons for the acclamation throughout the world of Sutter Automatic Shell Molding Machines.

SUTTER PRODUCTS COMPANY

2005 WESTWOOD AVENUE • DEARBORN, MICH.



These two A-C centritugal blowers supply cupola air at Howard Foundry Co., Chicago, specialists in high strength alloyed iron castings. Blowers are rated at 5500 cfm and 6300 cfm.

Compact, Close-Coupled

★ Close-coupled Allis-Chalmers blower design reduces space requirement.

★ Low noise level, long-lived cast iron casing.

★ Anti-friction bearings support the impeller and motor rotor, the only moving parts.

VITAL RELIABILITY in cupola operation is assured with Allis-Chalmers centrifugal blowers. Cupola operation is especially critical at the Howard Foundry Company since the component elements in production of malleable iron demand precise control.

A cast iron casing in Allis-Chalmers blowers reduces vibration, lowers noise level, and assures long life. With the impeller "overhung" on the motor shaft and supported by anti-friction bearings, the installation is compact and readily accessible.

The constant air weight control on the blower inlet automatically delivers more or less air, as required, without the necessity of blowing off to atmosphere and wasting power.

For more information call your nearest A-C sales office or write to Allis-Chalmers, Milwaukee 1, Wisconsin for Bulletin 16B6048B. A-3838

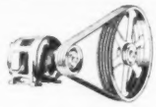
Foundromatic and *Regulex* are Allis-Chalmers trademarks.

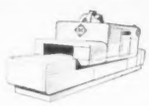
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

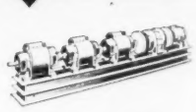
Foundry Equipment for Bigger Output—Better Working Conditions!

Foundromatic Shakeouts


Motors-Drives Control


Foundromatic Core Dryer

Induction Heating & Melting


Regulex Arc Furnace Control

Stronger

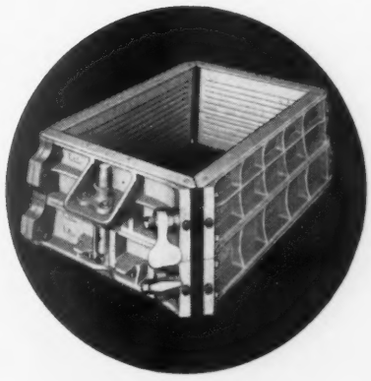
FREMONT MAGNESIUM FLASKS

assure longer service . . . magnesium
having twice the strength of aluminum.
Easier handling
also follows the fact that magnesium
weighs ⅓ less than aluminum.
Accurately machined
inside surfaces and flanges, and steel-faced
top and bottom flanges
make possible far more exacting work.

Write today for free literature and prices on

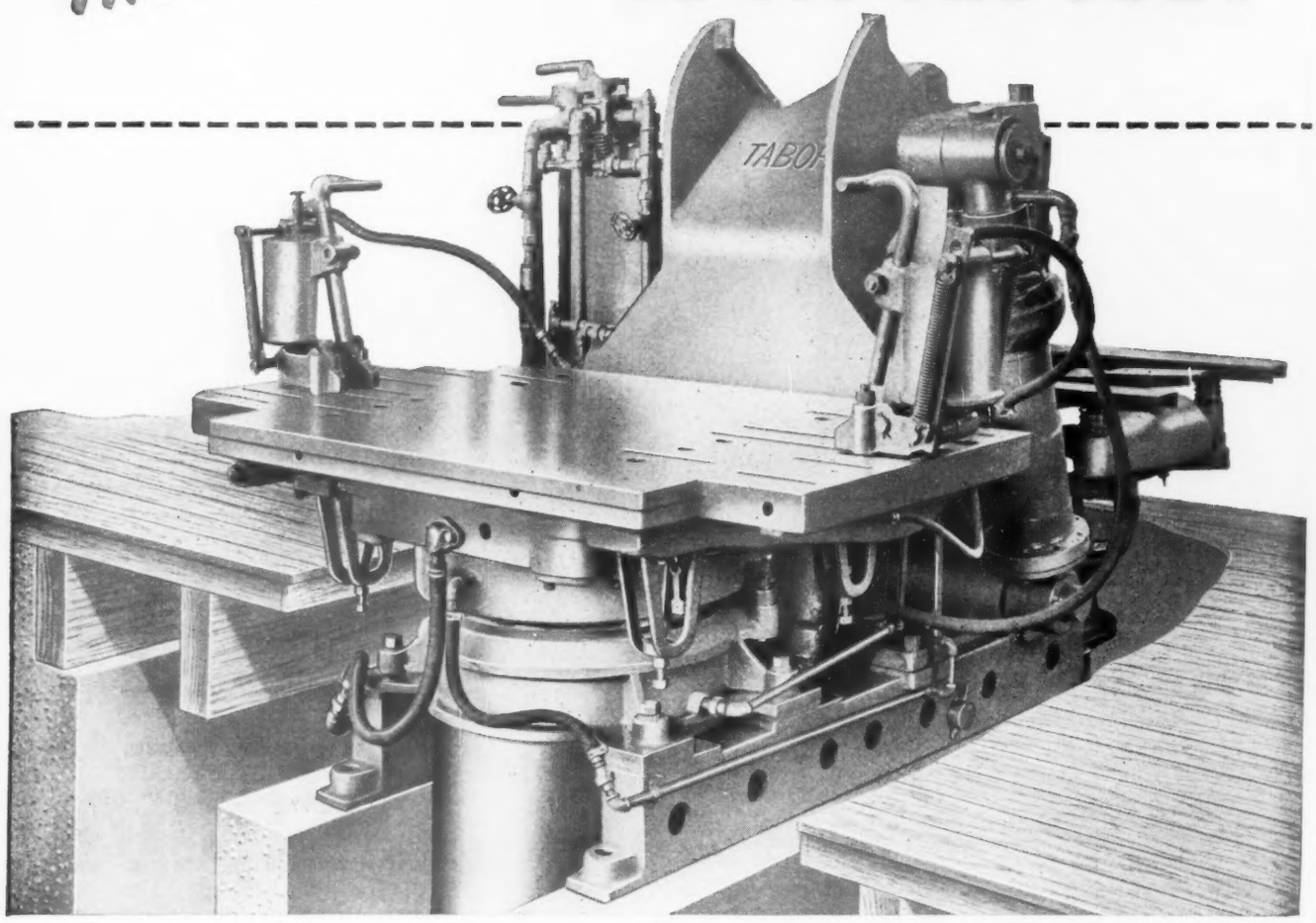
The New

FREMONT SPREADLOCK FLASK
FREMONT STANDARD SLIP FLASKS
FREMONT CAST IRON
OR CAST ALUMINUM JACKETS



The FREMONT FLASK CO.
FREMONT, OHIO

There's A TABOR ROLLOVER TO FIT THE JOB!



PICTURED is only one of Tabor's large and diversified family of foundry-proved Rollovers. This one's a 3,000-lb. capacity, *shockless* job. The rollover plate is 40" wide x 50" long. When air-operated flask clamps are used (as shown), it handles pattern boards ranging in length from 24" to 56". Even with modest pit requirements, the plate is only 15" above floor level for easy workability. Accommodates a 43" deep flask (including pattern board and bottom boards)—minus the draw required. Maximum draw on the unit shown is 15". With modifications we can provide for a 55" flask depth on the basis outlined above, and a 20" draw.

Tabor Power Rollovers run the gamut of size and type. They range from 450-lb. to 3,000-lb. capacity. All are *completely* power-operated and can be furnished with air-operated flask clamps. You can choose between plain or shockless jar, and some types are portable. All incorporate Tabor's famous air-on-oil principle for a perfect draw. All perform up to full rated capacity, completing a cycle of operations in the fractional part of a minute.

Complete Rollover family is presented in Bulletin #514—just off press. Write for your copy. Then team up with Tabor for a quick and satisfactory solution to any Rollover problem.

REPRESENTATIVES
Snyder Foundry Supply Company, Los Angeles, Calif., The Pacific Graphite Company, Inc., 40th & Linden Sts., Oakland 8, Calif.; Carl F. Miller & Company, Seattle, Washington; Harry H Reich, Trussville, Ala

FOUNDRY EQUIPMENT MEMBER FEMA MANUFACTURERS ASSOCIATION INC.

The TABOR Manufacturing Co.

SINCE 1884 MANUFACTURERS OF FOUNDRY MOLDING MACHINES
6225 TACONY STREET • PHILADELPHIA 35, PENNA.

EXPORT DEPARTMENT, 765 DREXEL BLDG., PHILA. 6, PA.

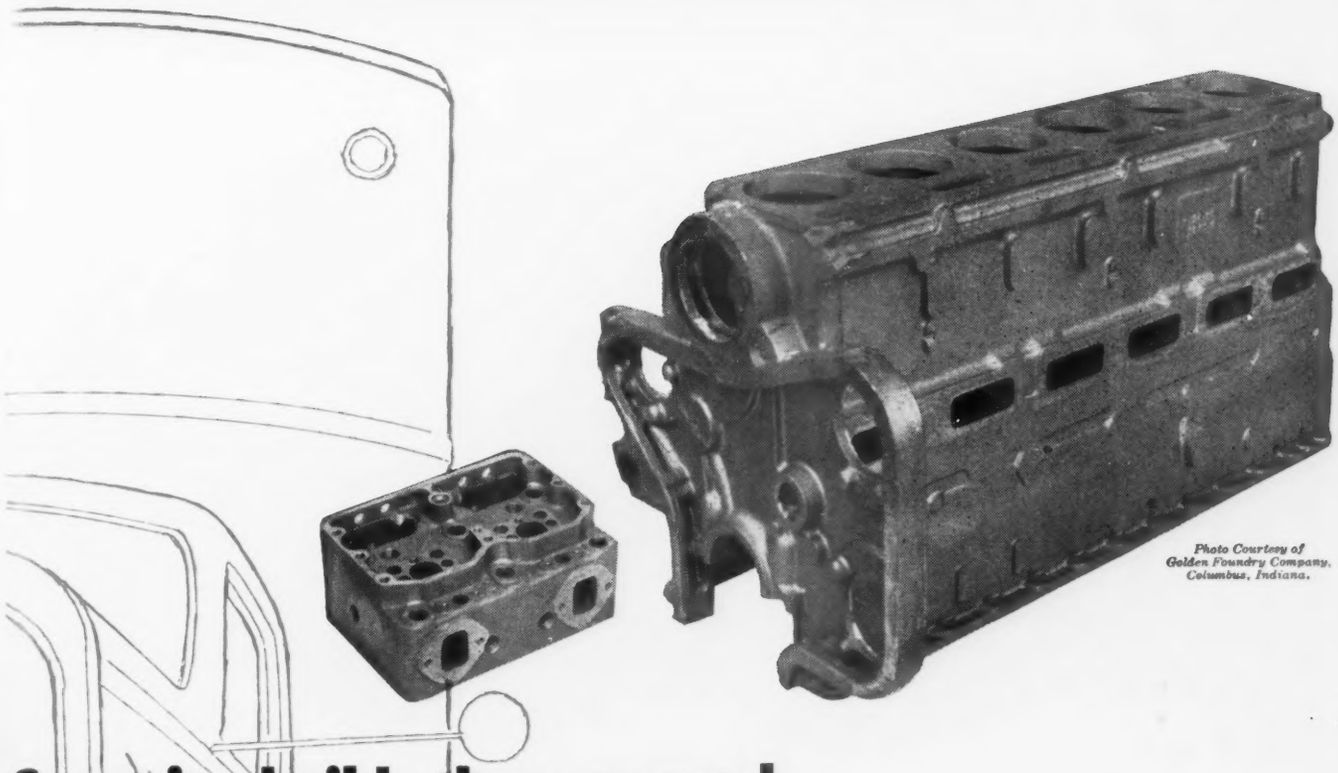


Photo Courtesy of Golden Foundry Company, Columbus, Indiana.

Cummins builds them rugged...

with mighty rigid "Specs"

For rugged dependability, many of the nation's leading truck lines will agree, you can't beat a Cummins Diesel engine. A good reason for that reputation can be found in the rigid requirements for all component engine parts—including the block and cylinder head castings shown above.

To meet these strict requirements, the foundry which furnishes the castings has long made it a point to use only the finest pig iron—including Republic CHATEAUGAY. And the result: *Uniform high strength and machinability throughout every casting,* despite intricate passages and adjoining light and heavy sections.

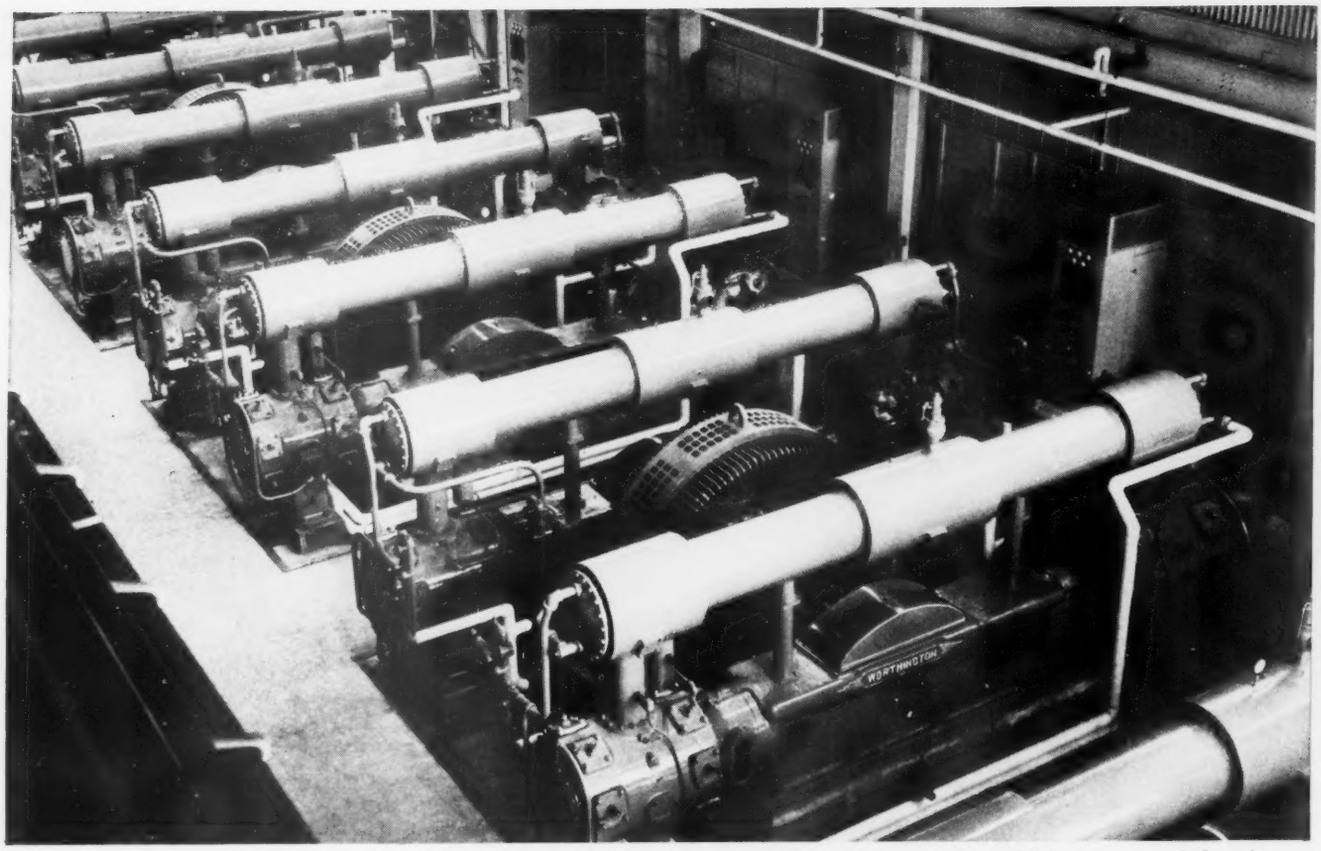
A Republic Pig Iron Metallurgist will be glad to give you the complete facts about CHATEAUGAY Pig Iron. Write, wire or phone:

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL



SIX WORTHINGTON HORIZONTAL-DUPLEX COMPRESSORS—five ODC-2 water-cooled units (background, left) with 9414 cfm displacement each, and one DC-2 two-stage 1858-cfm unit—make up the entire air supply at the new Brookpark Village, Ohio, foundry and engine plant of Ford Motor Company. Foundry will produce all blocks and heads for the engine plant.

Ford installs 41,500 cfm of Worthington compressors to supply air to new foundry and engine plant

When you build a foundry and engine plant as large as those Ford Motor Company recently completed at Brookpark Village, Ohio, compressed air becomes a major consideration.

That's why you'll find they've installed six giant Worthington compressors in the power house that supplies compressed air to the foundry and engine plant together totaling over 2,000,000 square feet of floor space. Ford is expecting a lot of hard, continuous and efficient work from these big units—and the experience of industry everywhere says that they'll get it.

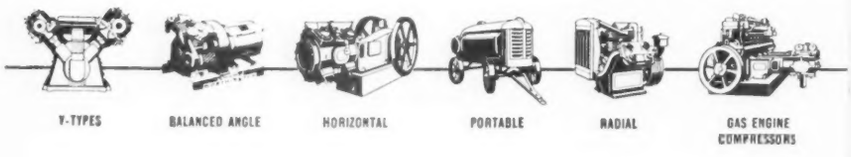
A mere look at these ruggedly built units suggests their dependability, but what surprises some new users is their high operating efficiency. Worthington horizontal compressors assure you of air as you need it . . . in the quantities you need—and most of all, they give it to you at the lowest possible cost.

Worthington features that mean lower operating and maintenance costs are: (1) *the variable capacity control* that provides exactly the air volume needed regardless of load conditions *also makes possible* lower operating temperatures at part loads, reduced part load power consumption, and minimum cylinder and ring wear with less carbon deposits on valves. (2) *Worthington's exclusive Feather* valve*—simplest, lightest, and most efficient valve made and (3) the high *efficiency intercooler* that needs less water, less power, less attention.

There's a Worthington compressor built to supply your compressed-air requirements dependably and efficiently. Write today for Bulletin L-675-B1B to Worthington Corporation, Compressor Division, Buffalo 5, New York.

*Reg. U. S. Pat. Off.

K.2.7



No Other Compressor Will Outperform a Worthington

WORTHINGTON

Compressors

DESULFURIZE with SODA ASH

It costs no more to get this Quality Soda Ash . . .

SOLVAY
Trade Mark Reg. U. S. Pat. Off.

DENSE SODA ASH

Especially Designed for Desulfurization

* Medium Grain Size
* Dustless
* High Chemical Purity

Technical Assistance Available—if you have sulfur problems with your grey or malleable iron castings, we invite you to write to SOLVAY's foundry consultant. There is no charge or obligation for this service.

Want More Information on Equipment for Adding Soda Ash?

Efficient, economical, easy-to-operate equipment for feeding Soda Ash into molten iron for desulfurization is now available. We'll be glad to have our foundry consultant supply you with more information if you will give us details of your operation.

SOLVAY
Alkalies Chemicals
Since 1881

SOLVAY PROCESS DIVISION
ALLIED CHEMICAL & DYE CORPORATION
61 Broadway, New York 6, N. Y.

BRANCH SALES OFFICES:
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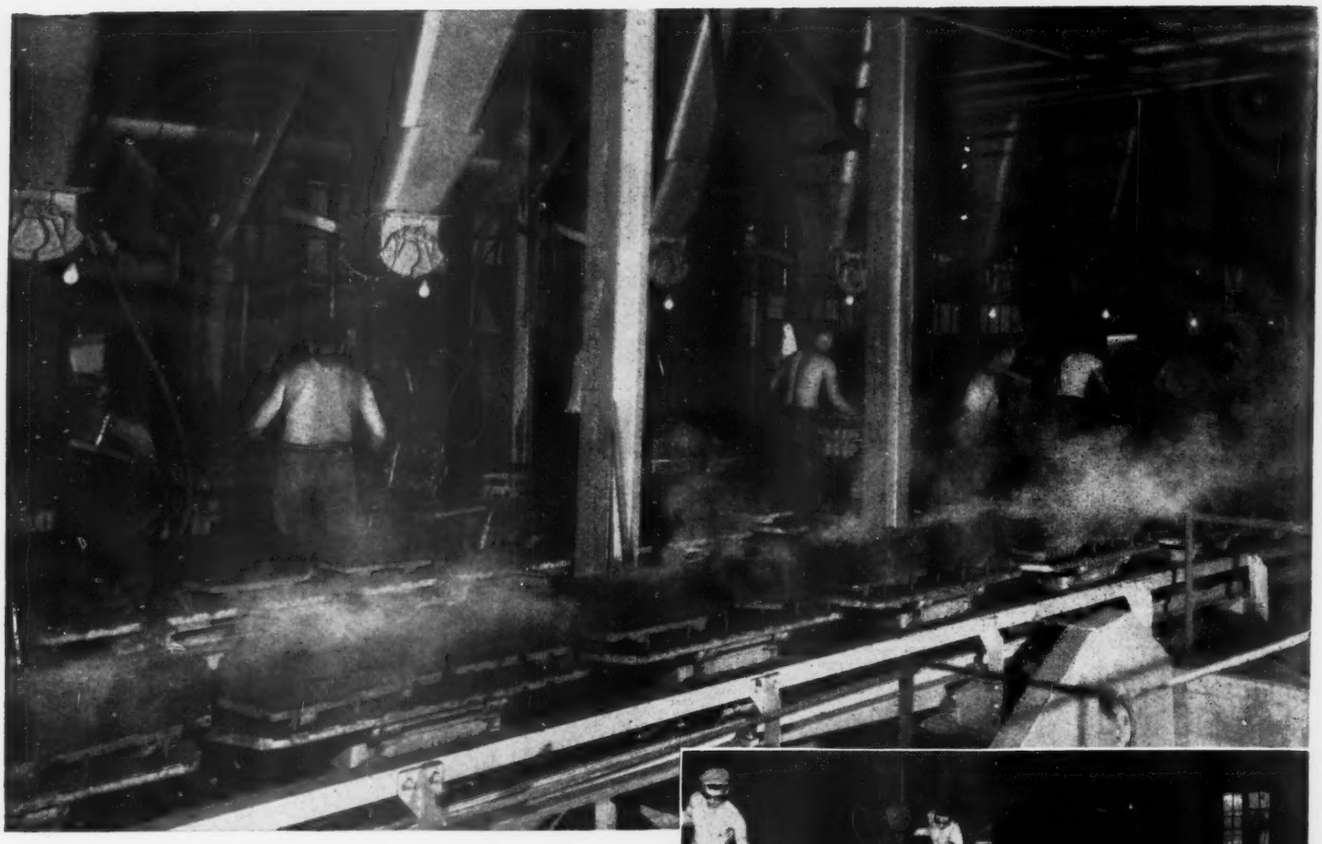
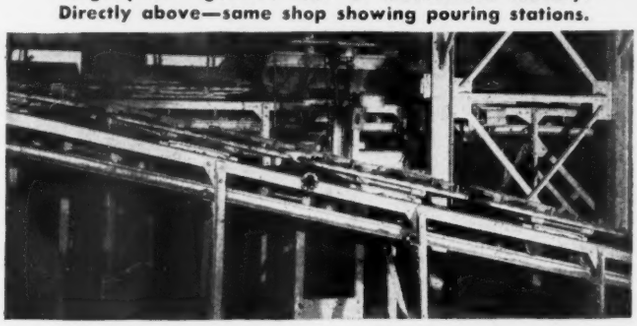


Large photo—general view of mechanized foundry. Directly above—same shop showing pouring stations.

. . . . . GOES MODERN

Another medium-sized foundry mechanized by Jeffrey. A practical solution to the mechanization of a gray iron foundry making small castings. Sand handling and conditioning, mold conveying, pouring and dumping . . . all worked out to provide "tops in mechanization." Moving smoothly through each operation . . . that's the secret.

Whether your foundry is large or small, we will be glad to help you improve operations—make lay-outs if necessary—to prove that mechanization pays off. Write today.



Uphill or downhill makes no difference with Jeffrey mold conveyors. Note automatic dumper—no men needed here.

THE JEFFREY MANUFACTURING COMPANY

907 North Fourth St., Columbus 16, Ohio

1877 75 YEARS 1952

Baltimore 2 Boston 16 Cincinnati 2 Detroit 13 Houston 2 New York 7 St. Louis 1
Beckley, W. Va. Buffalo 2 Cleveland 15 Forty Fort, Pa. Jacksonville 2 Philadelphia 3 Salt Lake City 1
Birmingham 3 Chicago 1 Denver 2 Harlan, Ky. Milwaukee 2 Pittsburgh 22

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio

USCO D-2

Looking for lower alloy costs? Select USCO D-2! This is an all-purpose 4% Cu 3% Si aluminum alloy, and like all USCO products, it is produced under our famous Production Control System . . . has been job tested and approved. A few of its advantages are: good castability—excellent machining and finishing properties—less shrinkage. Ask your USCO salesman about D-2 now.

FREE USCO Aluminum Alloy Selector. A handy aid to analysis, specifications and many other foundry problems.

For 48 years, pioneers in aluminum development.

USCO **U. S. REDUCTION CO.**
East Chicago, Indiana

PLANTS: EAST CHICAGO, INDIANA • TOLEDO, OHIO

STUDEBAKER

USE DELTA CORE WASHES ... *Exclusively* AT THEIR FAMOUS SOUTH BEND FOUNDRY

Dry Dipping of jacket cores with DELTA GRAKOAT

Green dipping of barrel and crankcase cores with DELTA GRAKOAT

. . . FOR QUALITY, SPEED AND ECONOMY

DELTA GraKoat Wash . . . (the original white plastic-type wash developed by DELTA laboratories 18 years ago) has been used consistently by leading automotive and tractor foundries ever since it was first introduced. **Here are the reasons why:**

1. EASY TO APPLY
2. MOISTURE PROOF
3. NO PRECIPITATION
4. NO GAS
5. HIGHLY REFRACTORY
6. UNUSUALLY HIGH FUSION
7. ADHERES TO SAND
8. PRODUCES SMOOTHER SURFACES
9. COST LESS TO USE

OTHER DELTA FOUNDRY PRODUCTS

CORE AND MOLD WASHES:

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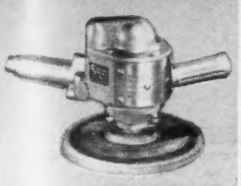

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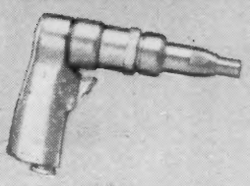

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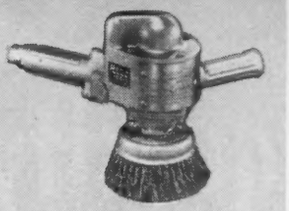

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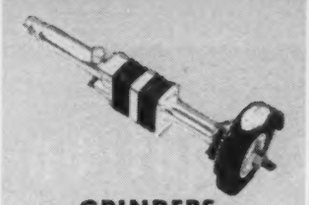

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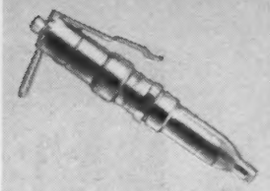

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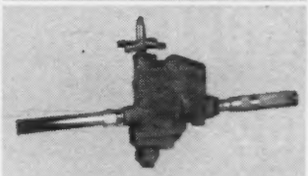

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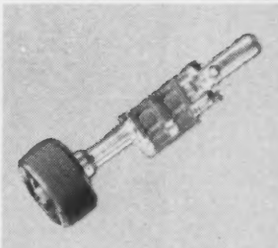

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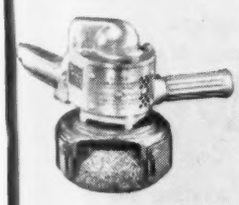

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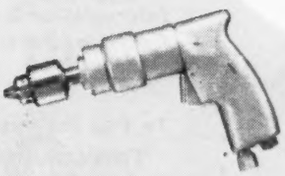

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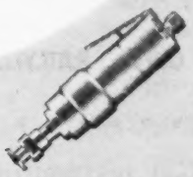

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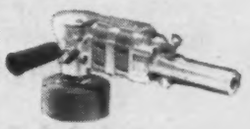

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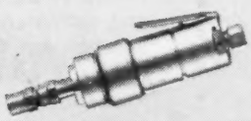

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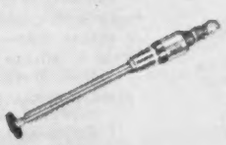

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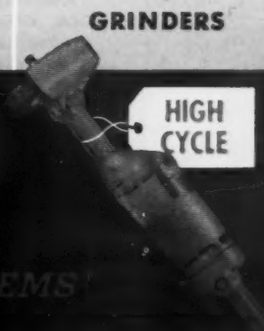

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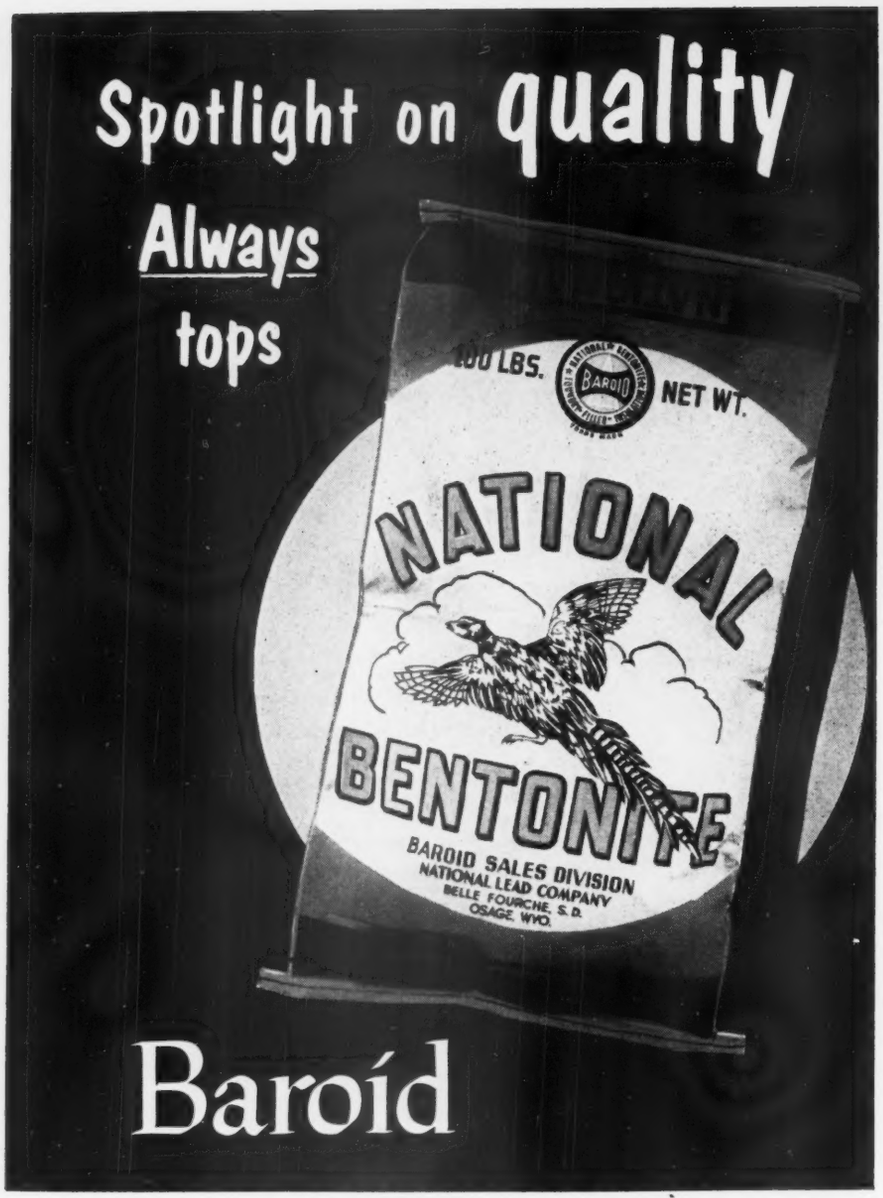

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Readers' COMMENT

Kind Words from Overseas

TO THE EDITORS:

Upon the attainment of the Diamond Jubilee of FOUNDRY, I and the staff of the *Foundry Trade Journal* send to you and your colleagues our very warmest congratulations. The enlightened editorial policy pursued by you and your predecessors has added much lustre to the escutcheon of the world's great family of foundrymen. May it long continue to flourish.

V. C. FAULKNER
Editor

Foundry Trade Journal
London, England

* * *

Our Vol. 1, No. 1

TO THE EDITORS:

I certainly got a kick out of the September, 1892 issue of THE FOUNDRY. In reading some of the articles I thought many of today's articles could be just reprints of Vol. 1, No. 1.

Congratulations on the 60th anniversary of FOUNDRY. I am hoping for another 60 years of good valuable information to the foundrymen from FOUNDRY.

Lawrence D. Pridmore
President

International Molding Machine Co.
LaGrange Park, Ill.

●

TO THE EDITORS:

Thank you for sending me Vol. 1 No. 1 of FOUNDRY. This is most interesting.

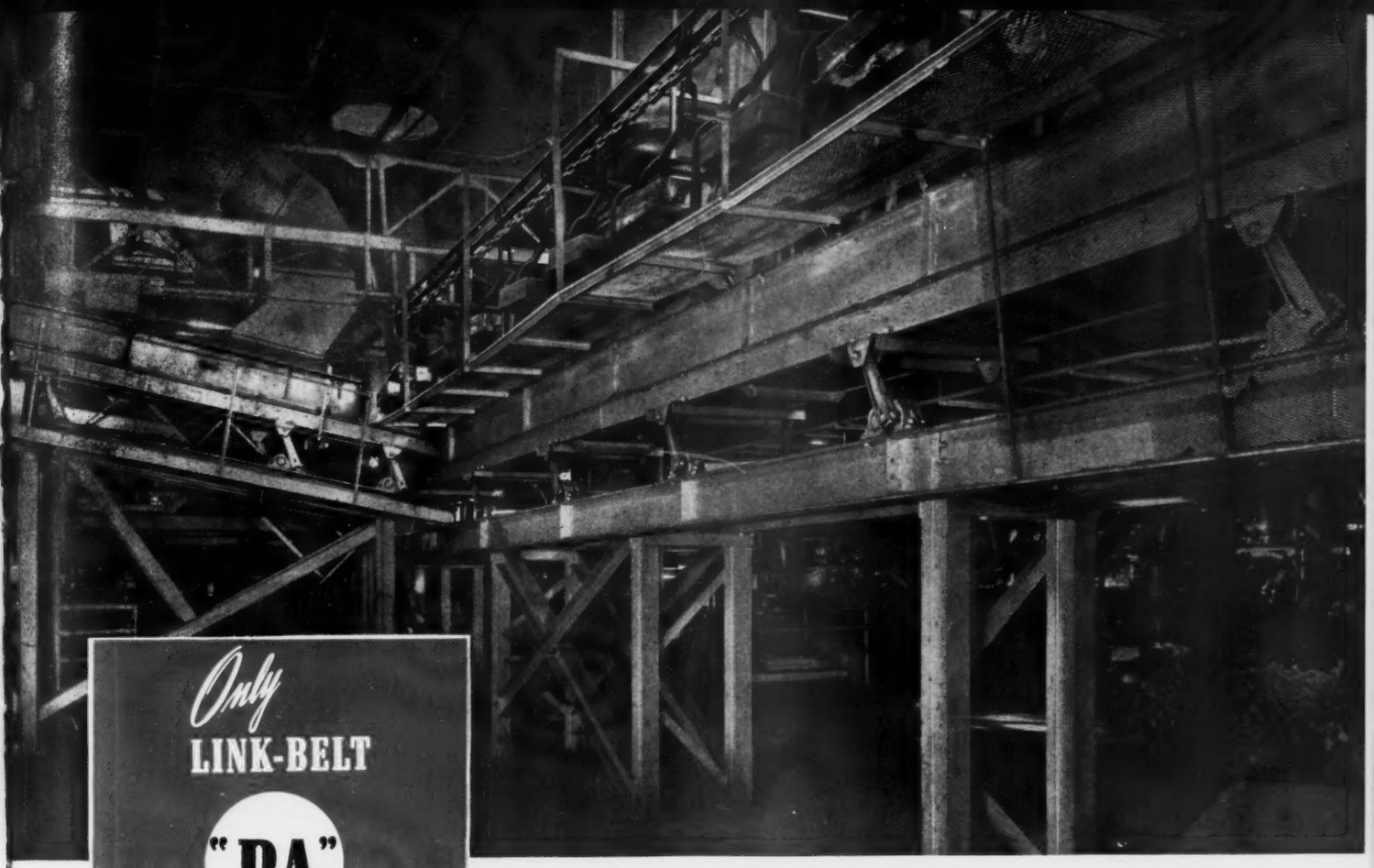
One cannot help but reflect how your paper has grown in the 60-year period to its present heavy thickness and commanding stature, well respected by the entire foundry industry.

I am sure it will continue to be looked to as a principal source of foundry information and that it will keep pace with the progress made in its field.

My congratulations to the entire FOUNDRY staff.

C. L. PETERSON
Advertising Manager

The Cleveland Crane & Engineering Co.
Wickliffe, O.



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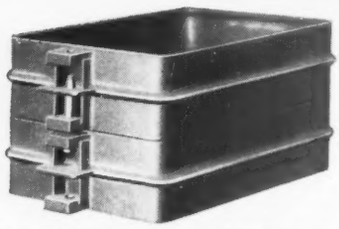

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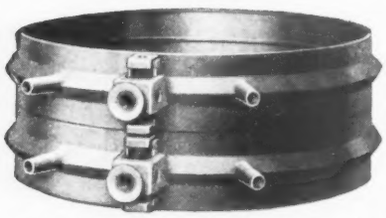

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It's Up to the Boss

If top management of each foundry in the United States would be asked the question, "Do you believe in safety for foundry workers?" all of the answers undoubtedly would be "Yes." The questioner probably would be accorded a raised eyebrow, for, of course, foundry management believes in safety.

While a relatively small number of top executives would be truthful in their profession of interest, because the safety records of their organizations are consistently excellent, the fact remains that all too many foundrymen in positions of top management actually do not take an active interest in foundry safety. Were this interest more than a figment, the overall safety record of the foundry industry as a whole would be greatly improved.

The unfavorable safety record of the foundry industry, as compared with other industries, was emphasized recently by William N. Davis, director, Safety & Hygiene and Air Pollution Program of AFS. For the first quarter of 1952, he stated, the average frequency rate of the foundry industry (number of lost-time accidents per million man-hours worked) was 26.9. Gray iron foundries had a frequency rate of 29.6, steel foundries 27.6 and nonferrous foundries 23.5. To get an idea of where castings producers stand in the matter of safety, compare these figures with a frequency rate of 4.6 for the basic steel industry and an average of 13.5 for all industry.

Importance of producing greater safety in the foundry industry has been recognized by various organized groups, and much time and effort has been devoted to creating greater interest in safety. The several foundry trade associations have conducted safety contests and awarded plaques to winners. They have published safety bulletins and safety manuals that provide helpful data on the subject. Insurance companies and other interested organizations have tried to sell the safety idea. Why, then, does the record of the industry remain too near the foot of the class?

The answer is simple. It lies with top management. In all too many cases heads of companies have not translated the professed belief in safety into action. Top management has not insisted that safety be given top billing among the production problems of the company, and has not developed a well organized program that carries the zeal for plant safety down the line to every supervisor and worker. Until this is done, safety cannot show much improvement.

Isn't it time for those with poor records to emulate the foundry brothers who have done a job in safety?

Frank G. Steinebach
Editor

The "Ideal" Steel Jobbing Foundry

By HARRY G. SCHLICHTER
Vice President and Sales Manager
Beardsley & Piper
Division, Pettibone Mulliken Corp., Chicago

THERE is no such thing as a perfect steel foundry. When a particular steel foundry layout can be designated as perfect, our forward progress will have stopped, for no improvement could then be made. Basically, regardless of how advanced a foundry becomes, there is always room for improvement, for modernization of process, for improvement of technique, for increased production and for lowered costs.

Perfection is something to be approached as closely as possible. In a discussion of a steel jobbing foundry, that close approach may be called the *ideal* steel jobbing foundry layout. For purposes of this discussion, let us assume that we are aiming at a monthly production of about 300 tons of finished castings, ranging in size from 1 lb to approximately 3000 lb, and let us assume that this work is of a jobbing nature with job-runs varying from 5 to 100 castings per pattern. To make our discussion even more applicable to actual operating conditions, let us assume that our ideal foundry will melt two basic steel compositions in large quantity, with occasional heats of other alloys.

Modernizing an Existing Plant — Obviously, our foundry will have to be extremely flexible, yet offer production economies that will permit competitive bidding on large runs of castings. But, to make the problem more interesting, let us further complicate the situation. Let us assume that, instead of building a new foundry from the ground up, we must modernize an existing plant with a present capacity of approximately 120 tons of finished castings a month. Here is a situation which the operating foundryman is much more likely to encounter. The opportunity to build a foundry from the ground up occurs only rarely, while the opportunity to modernize and improve existing facilities is always present.

In fairness to those operators who have been trying to improve their operations for years without success, we should note that there are many plants that just can't be modernized economically. Only too frequently, a foundry resists any attempt at mechanization. Such a foundry is shown in Fig. 1.

Let us examine this plant that resists any attempts at successful mechanization. In the first place, the property on which the foundry is located is too small for any effective expansion. Expansion to our proposed capacity of 300 tons of finished castings per month would be highly improbable.

The two smaller bays, each 20 ft wide, are far too narrow to permit the installation of modern handling equipment. If these two narrow bays were to be combined in one, the supporting columns would offer a considerable obstacle to efficient layout. In the main bay, the crane clearance is only 12 ft, and here again this would place a severe limitation on any effective mechanization. The pattern storage location within the main foundry building offers a continuing hazard to stored pattern equipment, and pattern insurance could be obtained only at high rates.

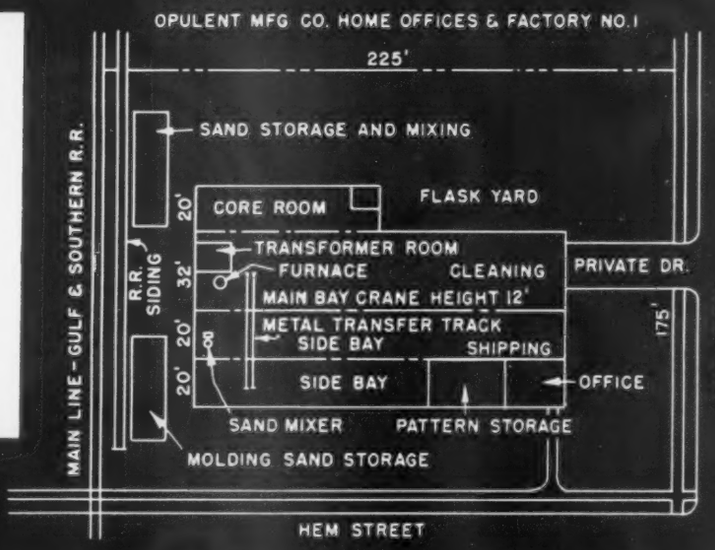
The location of the melting furnace in the low main bay is an obstacle to any effective charging set-up. The lack of crane facilities in the side bays and the very low crane clearance of the main bay make the building generally unsuited to expansion of capacity. Although many changes could be effected to make the operation of such a foundry more streamlined, it is highly unlikely that the building would be suitable for an ideal layout or for expansion to our proposed capacity.

Luckily, however, other buildings which appear at first glance to be equally unsuited to our ideal foundry layout have definite mechanization potentialities. Such a plant is shown in Fig. 2. Although the present foundry layout is far from ideal, it is quite typical of what might be found in a plant producing approximately 110-120 tons of finished steel castings per month. Our problem is to expand that capacity to approximately 300 tons a month and at the same time create an "ideal" foundry layout.

Obviously, such a program would not be undertaken by a foundry of this size in one step. Even the most ardent advocates of mechanization find a great deal to be said for a pay-as-you-go plan. But such pay-as-you-go mechanization should not be haphazard. Each step should be part of a definite overall plan leading to an ultimate objective. Not only must each step in the mechanization program justify itself on the basis of results to be obtained, but each step should also be capable of justification as a part of the overall plan.

In this case the entire main foundry building is only 100 x 160 ft in size, too small to accommodate anything like a capacity of three hundred tons a month without excessive crowding of activities. The coreroom—area No. 3 in Fig. 2—is poorly located in relation to the delivery of raw sand by railroad. This location of the coreroom also interferes with any

***STEPS** in modernizing a steel jobbing foundry are detailed in this two-part article. The discussion comprises a paper presented by the author before a Regional Technical and Operating Group meeting of the Steel Founders' Society of America at New Orleans*



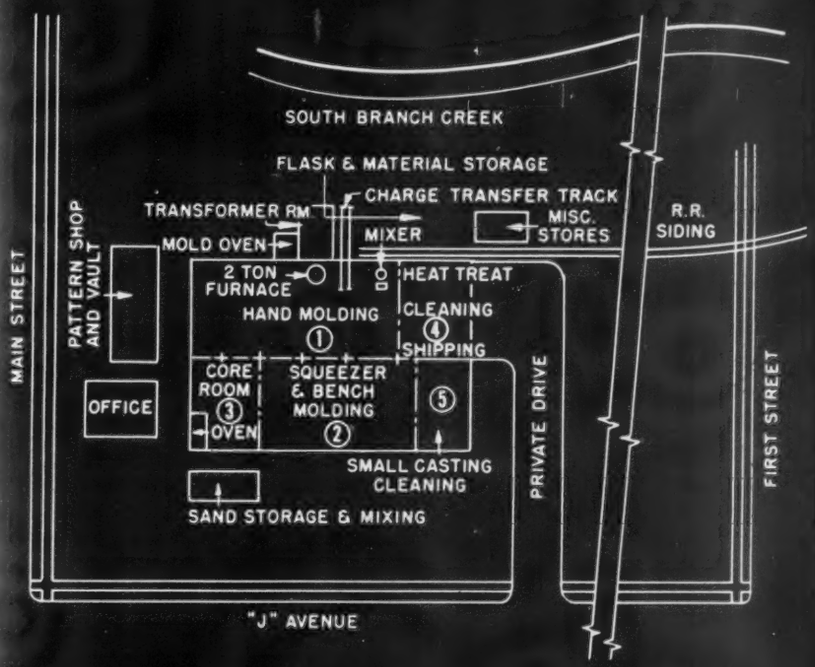


Fig. 1 (above)—Lack of expansion space, narrow bays and low head room prevent economically sound mechanization of this foundry

Fig. 2 (left)—At a first glance completely unsuited for an ideal foundry layout, this foundry has real mechanization possibilities

Fig. 3 (below)—This foundry started its mechanization in the small mold bay

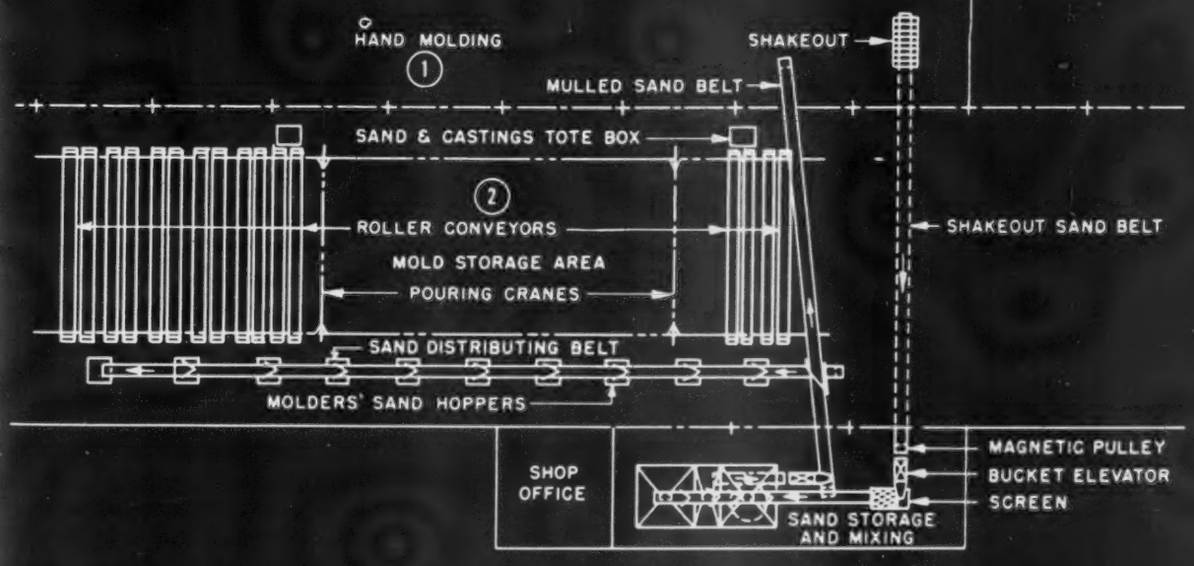


Fig. 4—Carefully placed equipment in this typical molding line for a small mold department achieves very smooth operation and a high production rate

possible expansion of the small mold department—area No. 2.

The location of the melting furnace in the main bay not only requires room that could be used for molding, but also leads to contamination of the air in the molding area. Outside flask and material storage, in an area not served by yard crane, makes extremely inefficient handling. Molding and other operations are carried on without the benefit of modern equipment, and the productivity of expensive labor is thus severely limited. Although the tract of land on which the foundry is located is large enough for any necessary expansion, that expansion is limited by the location of the office building and the pattern storage building.

Improve Man-Hour Efficiency—It might be well to analyze our problem foundry as to man-hour efficiency so as to give us a basis of comparison as mechanization proceeds. In area No. 1, where the larger molds are made, eight molders and eight helpers produce molds for castings weighing up to 2000 lb. In an average day these men make approximately 35 large molds with an average poured weight of about 200 lb. Thus, this area produces a little over 3 tons of finished castings per day.

In area No. 2, devoted to the production of small molds, four workers operate molding machines with mounted pattern equipment, while four workers ram up loose patterns at benches. Working from floor sand heaps, setting their own molds out on the floor, and pouring their own molds, the production of the four machine operators is limited to less than 100 molds per day. The men working with loose patterns are able to produce only about 30 molds per day. Assuming that the finished casting weight of each of these molds averages 15 lb, the daily production from this small mold department is a little over 3½ tons of finished castings.

Because the type of work done by this foundry requires only a moderate number of cores, 12 men in the coreroom—area No. 3—are able to provide the required production of cores. Sixteen men work in area No. 4, cleaning, heat treating and preparing the larger castings for shipment; another 12 men handle the cleaning of the smaller castings in area No. 5. Because the metal charging operation is almost wholly manual, eight men are required to charge and operate the 2-ton electric furnace on a single shift.

A 16-man night crew shakes out the molds and delivers the castings to the cleaning room. This crew also cuts the backing sand on the foundry floor and prepares separate facing sand for the next day's operation. All of these men, together with the incidental laborers required for handling materials, crane operation, setting-up patterns, sand testing, and other incidental duties, total approximately 110. Thus, 880 man-hours per day are required to produce less than 7 tons of finished castings. With a scrap rate of about 4 per cent, a foundry and cleaning rate of slightly under 130 man-hours per ton of good castings is attained.

In developing our problem we have reached two basic conclusions. First, that our ultimate goal for improvement of this foundry is a capacity of at least 300 tons per month of finished castings. Secondly, we have decided to reach that goal in a pay-as-you-go, step-by-step mechanization. A third requirement

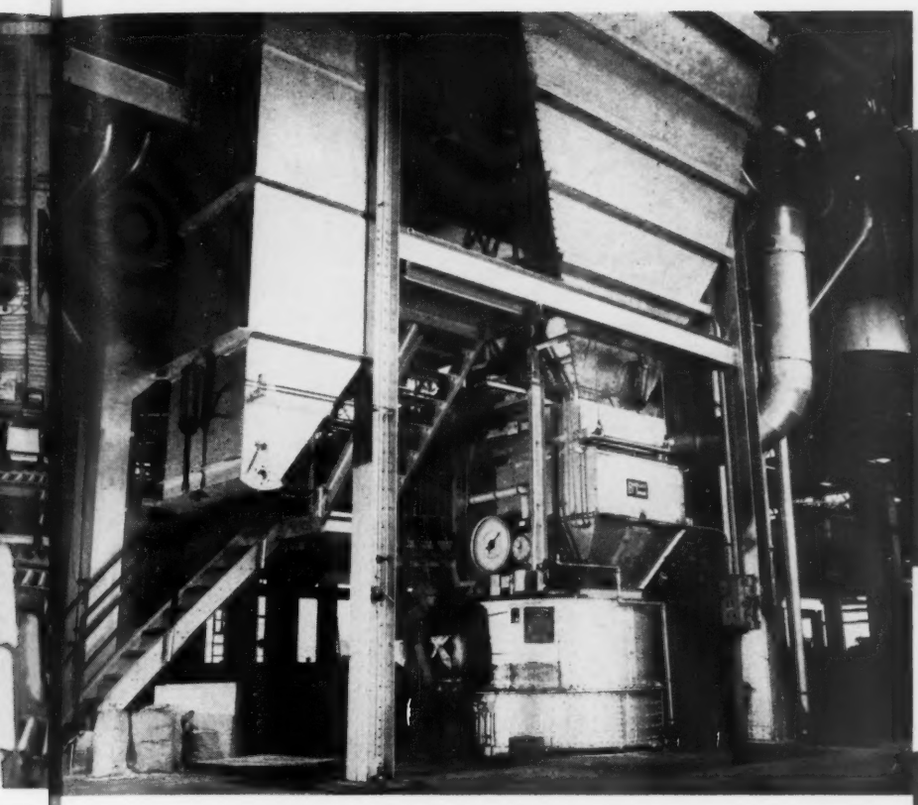


Fig. 5—Overhead storage of sand in this typical steel foundry sand mulling system cleans up foundry and provides for surges in molding sand demand

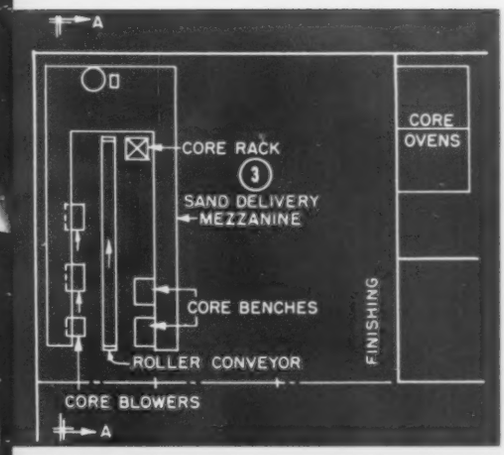


Fig. 6—Greater production of small molds means more cores are needed. Most are made by three core blowers served by this single delivery belt

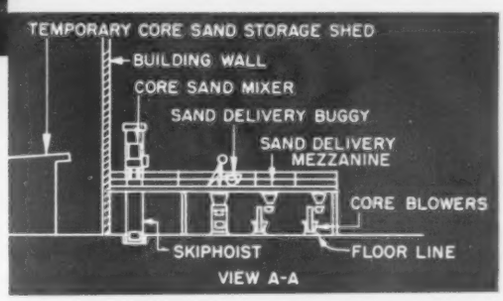


Fig. 7—Separately mulled core sand is delivered to core sand blowers and benches by overhead platform. One man can operate muller and deliver sand

should be added. We should insist that when our ideal foundry is complete, a total foundry and cleaning room rate of 70 man-hours per ton of good castings be attained.

In any step-by-step mechanization, it is always difficult to determine just where to begin. Since, in our problem foundry, the present melting capacity, with a 2-ton-per-hour furnace, is ample for current production and slight increases in production, it would seem appropriate to start our mechanization in the molding departments. Whether the first step will be taken in the large mold or in the small mold department will be dictated largely by the local demand for castings. Assuming that there is a greater demand at present for small castings, our first step will be in that department.

In the original layout, the location of the coreroom limited expansion of molding facilities in the small mold bay; therefore the coreroom has been located in a new building, shown in Fig. 6. This move has permitted the mechanization of the small mold bay, shown in Fig. 3. Not only has expansion of small molding been made to the left into the old coreroom area, but the building has been extended to the right to allow room for expanded cleaning facilities which will be made necessary by increased small mold production. Here ten molding stations have been provided, each with an overhead 1½-ton sand storage hopper supplied by a long sand distribution belt.

Cope and drag molding is done at the two stations at the left, and a standard solid flask 24 x 30 in. is used. Jolt-squeeze molding machines are used at each

Fig. 8—All coremaking stations are served by a central core delivery belt. This arrangement minimizes green core handling and prebaking breakage

Fig. 9 (above)—Even closer to the ideal arrangement, this setup has both core blowers and core-making benches served by the same delivery belt

Fig. 10 (below)—Small grinders are vital in small casting cleaning department. For ideal installation they are hooded for dust and fume exhaustion

of the other eight stations, but under ideal operating conditions only six of these eight stations would be manned. Two would be provided as stand-by stations to eliminate downtime during pattern and job changes. Such an arrangement also permits maintenance men to keep equipment at top operating standards without interrupting production.

Each molding station is provided with four gravity-feed roller conveyors on which to store and pour molds. Pouring is provided for by small floor-controlled bridge cranes which cover the entire conveyor area. Although this arrangement is in some ways more cumbersome than a monorail pouring system, it does provide a good deal more flexibility, particularly when different alloy compositions are handled. The provision for several pouring conveyors at each molding station also provides necessary flexibility in handling different alloy compositions.

Sand Preparation—To take full advantage of the higher production that will be obtained from this mechanized molding line, a complete sand preparation system is installed. This installation offers a very good example of planning each mechanization step as a part of an ultimate program. Although locating the shakeout in the adjacent bay is not as convenient, so far as this small molding line is concerned, as would be a similar installation in the same bay, this arrangement does have definite advantages when future planning is taken into consideration. The same is true of the long mulled sand supply belt extending into the adjacent bay.

With very little inconvenience the castings from the installed molding line can be carried in tote boxes to the shakeout by fork lift truck. To offset this inconvenience, the location of the shakeout permits the large molds, still made by hand, to be shaken out mechanically in the same bay in which they are poured. If the shakeout were located more conveniently to the small mold unit, the size of the large castings made in the adjacent bay would make it difficult or impossible to transport them across the bay for shakeout. With this arrangement, these large molds can be handled by crane.

In the same manner the relatively inexpensive extension of the mulled sand supply belt across the entire bay to the adjacent bay will provide for a vast improvement in conditions in the large mold bay. This simple belt extension will permit full advantage to be taken of the ample capacity of the mulled sand preparation system.

This system was installed with ample capacity for future expansion, and it is only good mechanization sense to take the greatest possible immediate advantage of this capacity. Thus molds in the large mold bay can be shaken out mechanically, and the sand delivered by under-floor belt to the sand system. All molding sand may be (*Please turn to page* 251)

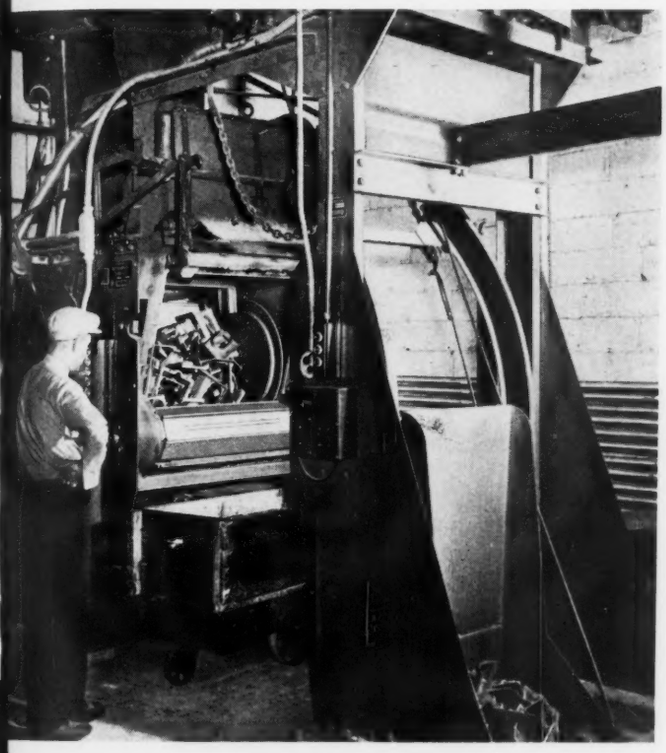
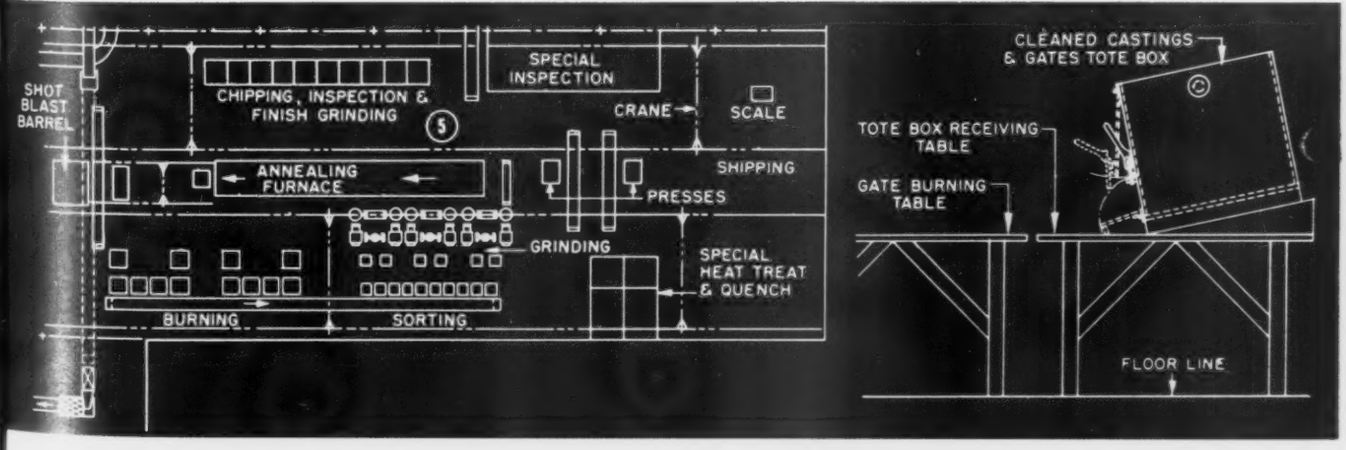


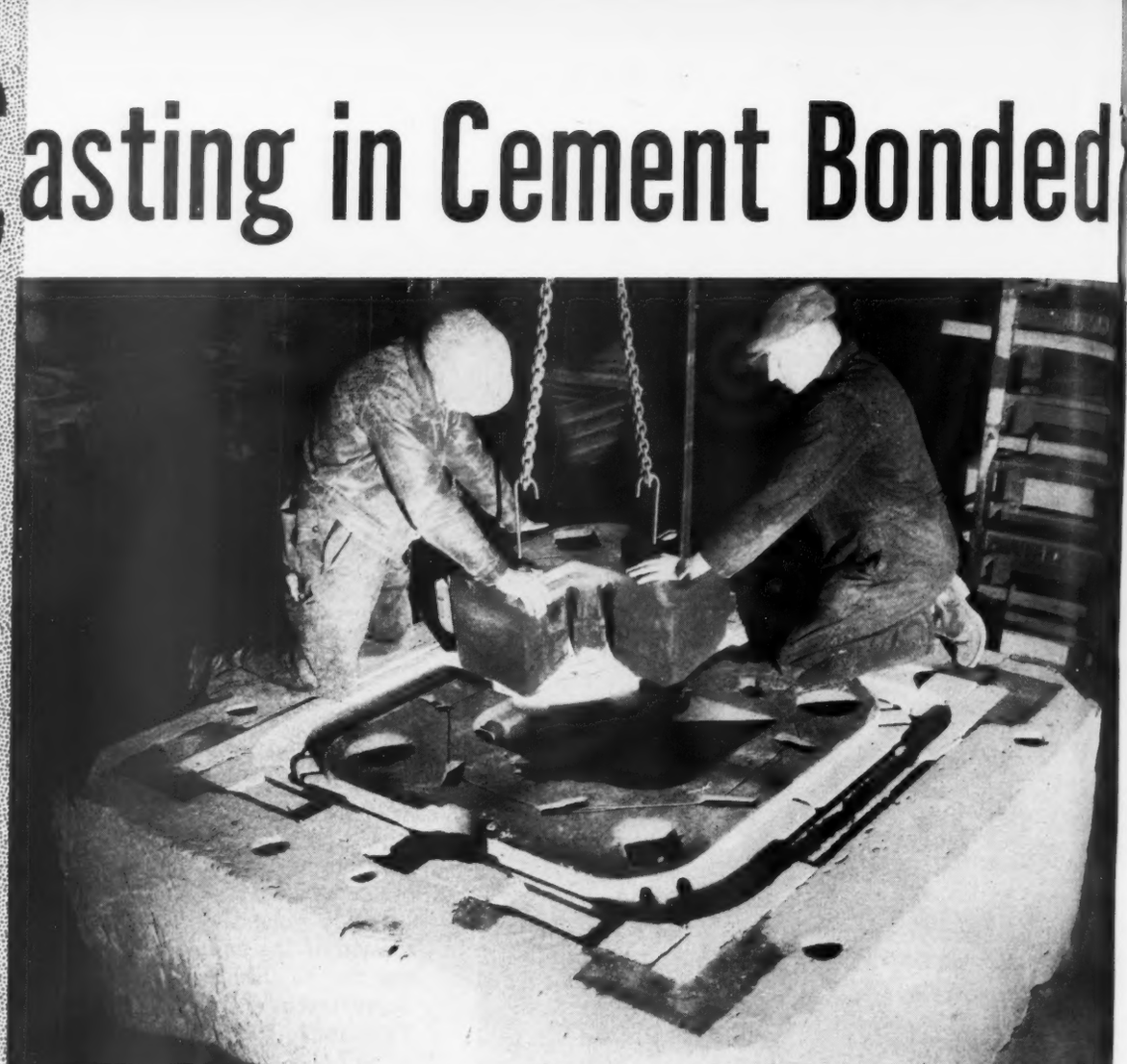
Fig. 11—In this typical airless blast barrel installation for a steel foundry cleaning room, direct discharge into tote boxes and skiphoist loading help ease the task of handling small castings

Fig. 12—Third step in mechanization is expansion and re-equipment of small casting cleaning section

Fig. 13—Tote boxes for handling small castings have special quick-action release locking device

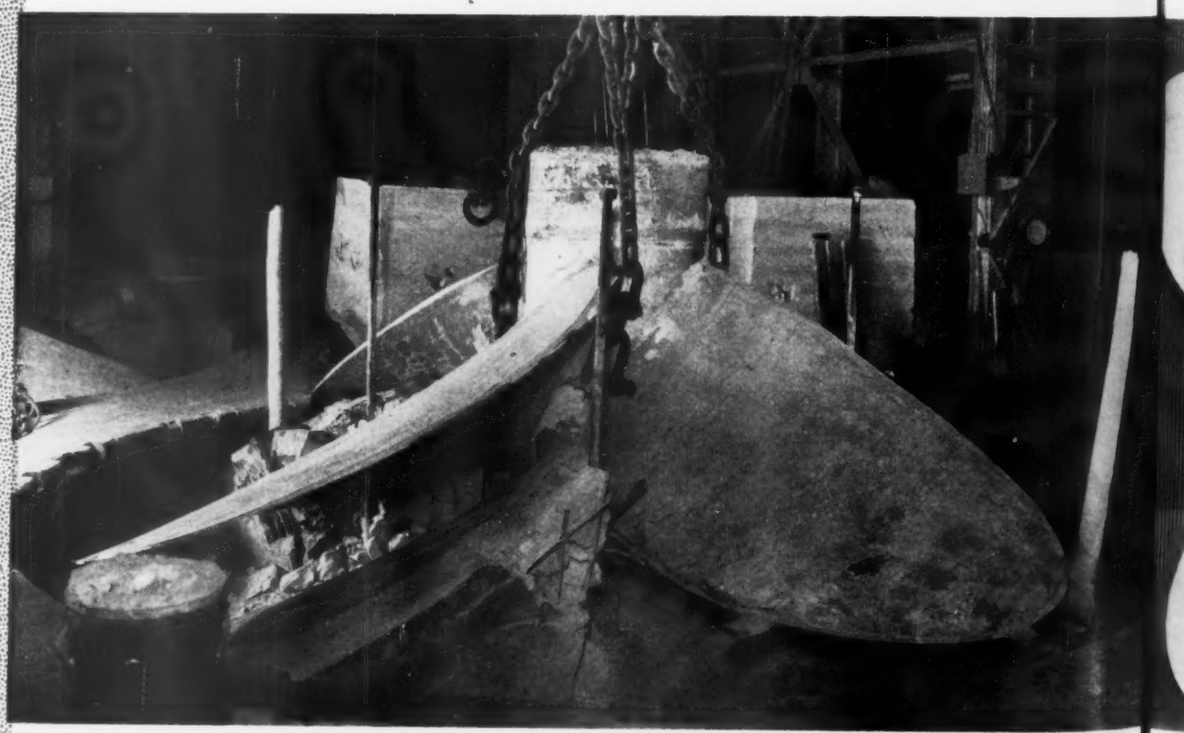


Casting in Cement Bonded S



(Above)—Coring up sand cement mold for 2500-lb cast steel excavator base. (Photo courtesy David Brown Foundries Co., Penistone, England)

(Below)—Stripping a large manganese bronze propeller from sand cement mold. (Courtesy Manganese Bronze Co., Birkenhead, England)



ed Sand

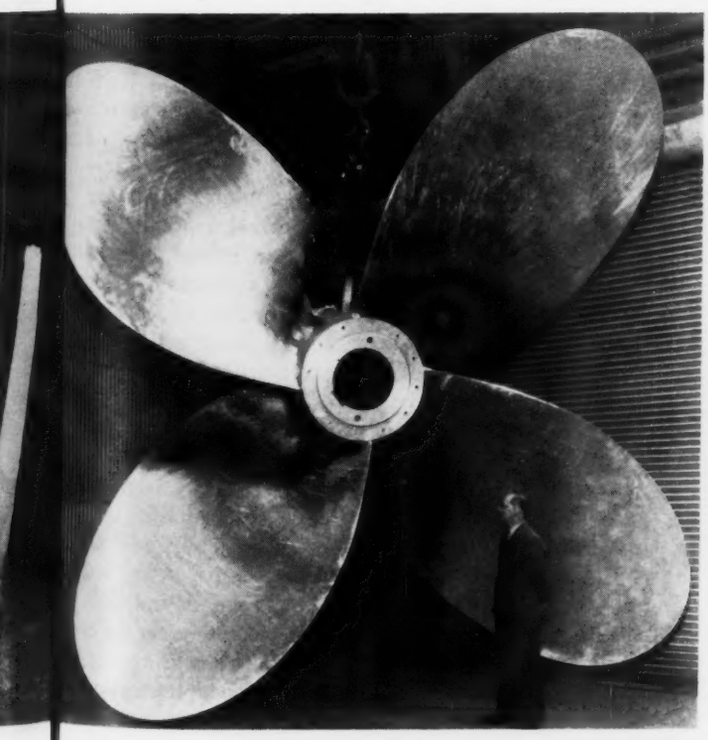
By J. B. McINTYRE
National Foundry College
Wolverhampton, England

SANDS bonded with portland cement find some application as a molding material, particularly in foundries formerly using loam techniques. Use of cement bonded sands was suggested first by the late Dr. Moldenke many years ago, but it was not until the Randupson process was developed in France about 1930 that this type of molding material was applied on a commercial scale. Sand cement molds are not permanent, or even semi-permanent, in character, since they are used once only in their original form. However, many features are peculiar to this type of work.

The molding material is silica sand bonded with portland cement mixed with water. Sand grain size is not critical, but in most cases the majority of grains are retained on 60 mesh. Cement and moisture contents are approximately equal; 10 per cent of each will suffice for general purposes. Enough moisture is added to secure sub-hydration of the cement only, to ensure friability during knock-out.

Raw materials are prepared in a mill which mixes quickly without grinding or milling. Maximum mixing time rarely exceeds 1½ minutes. For large molds the mixing equipment must be adequate to cope with short-cycle work. The mixed material is rammed round a pattern or in a corebox in the usual manner. In molds for larger castings, metal reinforcements and lifting staples are embedded.

Same propeller casting as shown at the left after cleaning and machining. Finished weight 28 tons



Ramming is easy and does not require the same care as when other materials are used. The cement sand mixture flows much more easily than ordinary molding sand. This is especially noticeable when steel rod reinforcements are used. These can be straight, as in ordinary reinforced concrete work, and the mixture need not be tucked around the inserts. The sand cement mixture can be struck up in a similar fashion to loam. Little sleeking or smoothing of the mold faces is required, and it is not necessary to sprig the mold faces as is sometimes the case when clay bonded sands are used.

The mixture has no appreciable green bond and must be handled in a similar fashion to loam. Also, it loses its molding property on exposure to the atmosphere for a period between 3 and 5 hours. All sand must be used within this period.

The completed mold is stored for periods varying from 18 to 48 hours to promote hardening. This time depends on the moisture content, shop temperature and the mold size. In most shops small molds are ready in 24 hours, medium-sized molds are ready in 36 hours, and even when the temperature is as low as 45° F, the largest mold needs no more than 72 hours for complete drying.

Mold drying time is influenced by shop ventilation. When the required storage time has elapsed molds can be coated with blacking or other facing materials if desired. Additional drying time is required for the facing and then the molds can be cast or stored indefinitely. Storage properties of cement bonded materials obviously are useful in the event of failure of metal or power supplies. Flasks are not needed, a very useful feature when large castings are required.

Cement bonded sands find considerable application in the production of large manganese-bronze and aluminum-bronze marine propellers and water turbine runners. Since 1938 the bulk of British production in this field has been made in sand cement molds. On the continent this system is in some cases applied to the production of ingot molds, and at one large British steel foundry sand cement is used exclusively for the production of a wide range of steel castings. After casting, the molds are stripped in the usual way, and the sand mixture passed through a simple type of crusher. The sand cement mixture is desilted and metallics are removed before mixing again.

Despite the excellent strength of the dried sand cement mold, there is no danger of the casting cracking or tearing from restricted contraction as the casting cools within the mold assembly. The mold faces readily disintegrate at elevated temperatures. Metal contraction allowances may require modification in certain cases. (*Please turn to page* 269)

QUALITY CONTROL . . . in the S

Quality control programs need not be limited to large shops. What the smaller foundry can do to maintain quality is discussed in this paper presented before the Gray Iron Founders' Society's 1952 annual meeting

WITH the industry as a whole becoming more and more "quality conscious" and larger foundries setting up elaborate quality control programs, many smaller foundries are beginning to feel left out. Many believe they cannot afford to inaugurate separate quality control departments. Actually, all foundries can have a quality control program that will work and will pay off in better castings.

Before a foundry attempts to set up any such program, it is well to take inventory first of what it already has. Each foundry, whether it refers to it as such or not, already has some quality control. Casting inspection, chemical analyses of iron, sand tests and numerous other routine checks are all the beginning of a quality control program.

In a smaller foundry—up to about 200 employees—one man must be responsible for quality control. The metallurgist, who has a practical knowledge of operations, is the man best suited for this job. His prime concern is the analysis and structures of the metal in the product—that is, the quality. Whether or not anyone can be supplied to work with him is entirely a matter of economy. Our company makes use of foremen in its program. This arrangement means, of course, that the foremen must be as conscious of quality as they are of quantity.

Perhaps the metallurgist is the melting foreman. In such a situation he is probably already a very busy individual. The inspection department is, then, probably the logical place to look for the man to put in charge of quality control. The foundry superintendent, the foremen and the production and scheduling group are all too much interested in getting the work out and meeting delivery dates. Standards department or time study men are chiefly concerned with getting rate of production up and total costs down. The standards department is indispensable in working with the head of quality control, but the two departments should operate independently. Another alternative is to release a foreman for this job.

After the man for the job has been picked, the only problem is to organize and to operate a quality control program. The man selected should be directly responsible to the head of the organization. He must then proceed slowly to gain the confidence and co-operation of the foundry superintendent, the foremen and the workers themselves. This requirement is a big order—but important for the success of the program.

The best starting point is the scrap pile. An accurate account should be maintained of all scrap castings and the causes of the scrap. The form of the scrap record is optional, but such pertinent data as date, customer's name, pattern number, total castings, total scrap and a breakdown of the scrap should appear on it. Fig. 4 is a sample form showing the scrap broken down according to a code at the bottom of the report.

The code contains a letter for the department responsible and a numeral for the actual defect. The code may be altered to suit particular operations. A careful analysis of the defects will certainly show where troublesome spots are, and discussions with the various foremen concerning the ones for which they are more or less responsible will be a large factor in gaining their co-operation and good will. When the foundry is ready to strike with an "all out" quality control program, it will have a good background of facts and figures with which to work, provided that the work follows a regular pattern through the plant.

At our foundry, work cast on Monday goes through the cleaning room on Tuesday and is shipped on Wednesday. Therefore, the scrap on Tuesday represents Monday's heat. Whether work follows this pattern is unimportant, but it is important to be able to determine on which day each casting is made. Together with the scrap report, records of sand tests, metal analyses, pouring temperatures and other factors should be maintained as accurately as possible.

A composite chart of sand properties and metal analyses will soon show how closely they are being controlled, and a study of defectives will show within what limits they must be held. Fig. 3 represents a typical metal analyses chart for a representative foundry. Additional space can be lined up for manganese, sulphur or other elements if the foundry is making alloyed irons. A good idea is to record also, beneath the chart, any change made in the charge when the points fall outside the prescribed limits. A record of sand test results may be set up in the same manner.

Moisture, permeability and green compression tests are sufficient for sand tests. Total carbon and silicon, with periodic sulphur, manganese and phosphorus analyses, will take care of metal analyses. The use of a

Small Foundry

By W. J. SOMMER
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Plainville Casting Co.
Plainville, Conn.

Customer:	Machine:	Flask:	Cope:	Drag:	Iron:	Pattern
Gates & Risers–	Facing–		Chills–		Core	
Pouring–	REMARKS & SKE					
Temp.–						
No. Weights –						
How Poured –						

Fig. 1 (above)—A representative foundry job record card

Fig. 2 (right)—The inspector should watch carefully for any nonconformities to pattern and report them to quality control

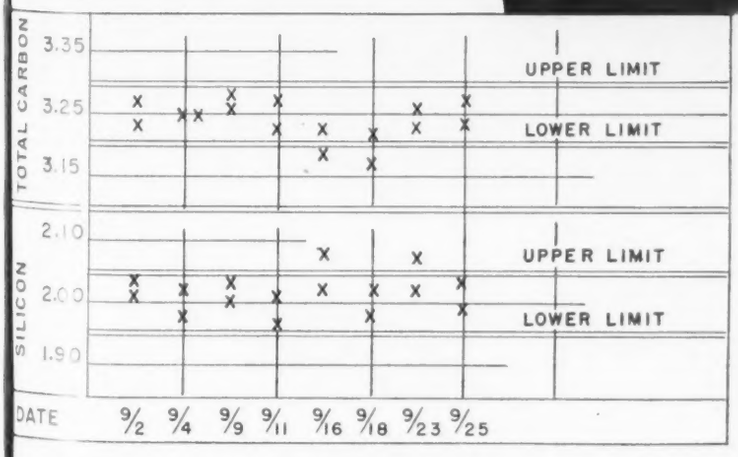

Fig. 3—This is a typical chemical analyses record

DAILY SCRAP RECORD

PLANT NAME _____ DATE _____

Customer's Name	Pattern No.	Total Cost	Good	Scrap	Code
Western Mfg. Co.	47 W 682	150	147	2	A-11
				1	M
Acme Tool Corp.	37459	85	83	1	W
				1	core omitted M-16

SCRAP CODE

C-Core	W-Weight	1-Dirty	5-Slag	9-Broken	13-Shift
M-Mold	S-Shakeout	2-Crush	6-Blow	10-Poured Short	14-Scab
A-Melt	G-Clean	3-Cold Shut	7-Shrink	11-Misrun	15-Cracked
P-Pour	X-Other	4-Drop	8-Runout	12-Strain	16-Other
	(Specify)			(Specify)	

Fig. 4—Daily scrap record should show these data

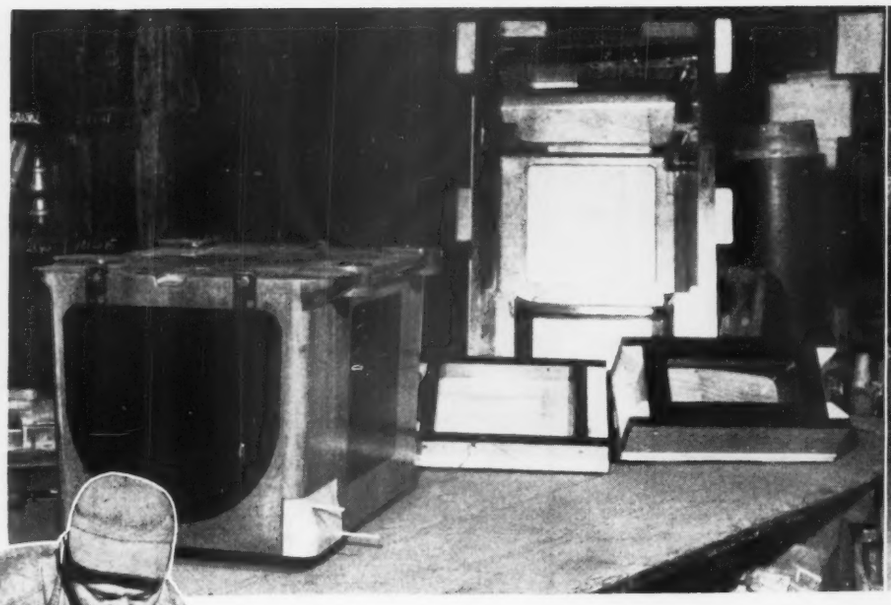

Fig. 5—Patterns should be checked for condition when an order arrives in the foundry, not when production is starting. Fig. 6 (right)—Cupola metal should be weighed; if no weighing facilities are available, weight can be estimated

Fig. 7 — Core being gaged; this insures that walls are of proper thicknesses

chill test for metal will augment metal analyses and permit checking of metal composition from ladle to ladle. Establishing the proper chill depth for each type of metal produced requires a number of carbon and silicon analyses. These, together with the corresponding chill depths measured, preferably in thirty-seconds of an inch, will soon give a range of chill depth for each iron. Once the preferred chill depth is established, biweekly or weekly chemical analyses, if the foundry depends on an outside laboratory, will serve as a check on chill tests. If the foundry has its own laboratory, it should by all means make more an-

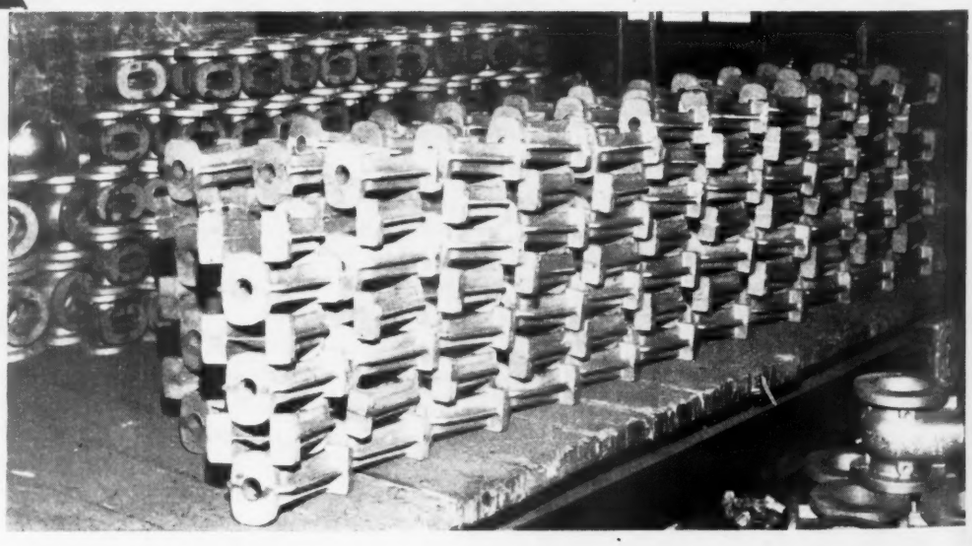

Fig. 8—The quality control program is designed to insure that only quality castings reach the shipping platform

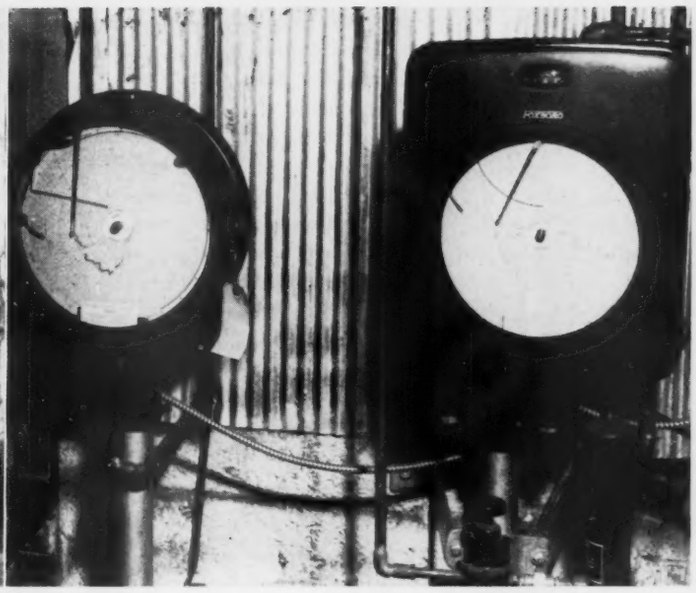

Fig. 9—At specified intervals temperature readings of the metal should be taken with an optical pyrometer. Fig. 10—(right)—Maintaining good cupola control requires a means of accurately measuring and recording air input and pressure

alyses of the iron going into castings.

Hourly carbon and silicon checks are very valuable for good metal control, but foundries which must send out a sample and wait a day for the result had better learn to depend on chill tests for control. Once the limits of sand properties are established, necessary steps must be taken to insure that they are maintained. If the man mixing the sand can take moisture tests and the melting foreman can take the chill tests, not too much of a burden is placed on normal personnel.

The next consideration is a little more refinement of the quality control program. The first step is preparation of the pattern, and the ideal situation is, of course, for the customer to consult the foundry before making the pattern. This is, unfortunately, not always the way it is done. The type of pattern equipment will always be a matter of economics; we cannot expect metal equipment for an order of five or ten pieces. However, the feasibility of design changes toward uniform section sizes, elimination of sharp corners and other helpful measures can be discussed over the blueprint before a pattern is made and will lead to a better casting.

Quite often orders for a certain item increase in quantity, and hundreds of castings are made from a loose wood pattern. One such order may result in savings in the cost of a casting that will more than pay for good equipment. I know of no better way to keep a customer happy than to tell him he can save $300 on an order if he will let the foundry spend $200 on new pattern equipment. The customer realizes that the foundry is on its toes, the foundry winds up with better pattern equipment, castings are more nearly uniform, scrap loss usually goes down and everyone feels better.

To this end, all equipment should be checked for condition when an order arrives, not when the pattern is sent out to the foundry for production (Fig. 5). The customer should be notified about any pattern in poor condition. If he wishes to proceed without repairing or replacing the equipment, the foundry is relieved of the responsibility of poor castings caused by inferior patterns. The checking of patterns is a job for the man in charge of pattern storage. He should report his findings to the head of quality control, who, in turn, should refer them to the proper authority.

The next step is to record the order and issue work cards. Our plant makes an office card, a production card, a molding card, a core card (if one is necessary) and a shipping card. All but the office card go to the foundry office to the person in charge of scheduling. As the work is scheduled, he files the production card and gives the molding, core and shipping orders to the respective foremen. The molding order contains such pertinent data as order number, quantity, pattern number, location of pattern, type of equipment, delivery date and other information.

The molding foreman steps into the picture at this point. Each job first should be checked against a record kept of each pattern the foundry has ever made. Flask size, height of cope and drag, metal specification, size and number of gates and risers, whether or not to use chills, type of facing, number of weights, pouring instructions and any special instructions are all listed on a card as shown in Fig. 1. If no card appears in this file, the pattern must be ordered to the pattern shop, to be reviewed by the foreman and by the foundry superintendent.

The proper gating and risering must be applied and the metal specification established. It might be well for the metallurgist to be in on the metal specification, and he even might be very helpful on gating. Just what proper gating is has been a matter of controversy for some time. Much work has been done on this subject recently, and we (*Please turn to page* 265)

Equipment requirements for setting up a mechanized shell molding unit, types of shell making machines available, and proposed layouts for commercial production are discussed here. This is the second and concluding article describing the International Harvester Co.'s development of its so-called Contour molding process

SHELL MOLDING . . . At International Harvester Co.

By GARNET P. PHILLIPS
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International Harvester Co.
Chicago

SMALL CASTINGS of aluminum and magnesium have reportedly been cast successfully in shell molds in which no backup material was used —that is, no metal shot, grit or sand to support the clamped shells. Our experience to date with gray iron and nodular iron indicates that such backup material is necessary to prevent swelling, finning and actual failure of the shells.

Tests made with metallic shot backing material versus sand backing material indicate that no practical difference exists insofar as heat conductivity is concerned. The fine sand-resin shells apparently insulate the metal poured in them sufficiently to nullify the heat conductivity properties of the backup material. Very meager quantitive data are available on this point, and research is being conducted on it. This insulating effect permits the use of somewhat lower metal pouring temperatures. The backup material heats up apparently in proportion to the mass of metal in the mold. A temperature of 650° F has been measured by our foundry laboratory in metallic shot about six-and-one-half minutes after a mold had been poured which contained 26 pounds of iron. High permeability of any backup material used is important.

Heating equipment used by various concerns in shell production includes gas or electrically heated ovens and patterns. It seems very evident that automatically controlled electrical heating of patterns will become standard. Resistance and infra-red heating have been experimented with in the electrical field.

Since phenol formaldehyde resins are relatively expensive, economic considerations dictate the use of minimum practical quantities. For this reason, shell thickness should be held to a minimum consistent with good foundry practice. Because of the resin cost,

extenders to replace part of the resin are being sought. Any decrease in resin cost will, of course, decrease shell molding costs. In addition, excessive shell thickness seems to be somewhat detrimental to casting finish anyhow.

Tongue and groove "dams" near the outer edges of shells and between down sprue and casting cavity help to prevent fins and to locate shells and are desirable on production equipment.

Shell Making Machines—An extensive investigation of the various shell making machines that are currently available or that will be available in the near future has been made. Some of these machines are being made for sale at the present time; others are still in the design stage and will be built some time in the future. A list of the concerns making or designing machines is given below, with a brief description of each make of machine. This list contains the names of all such companies of which we had knowledge at the time the present report was prepared.

Figs. 16-17-18—In this series of illustrations, a workman successively blows loose sand particles from shells for truck brake drums, assembles the shells for the mold and tapes the assembled mold

Fig. 19—Assembled shell mold is set in the flask, which will hold four molds for truck brake drums

The Shellmold & Machine Co. builds the SU1 shell mold machine, which is a single station type designed for a pattern plate size of 26 x 41 in. Stripping mechanism is designed for a length or height of 8 inches. The machine is equipped with gas-fired oven. Floor space required for the present model is 9 x 16 ft. Power for operating the various movements required is supplied by air cylinders. Air is controlled by solenoid valves actuated by limit switches and timers. This machine was designed to produce 40 shells per hour. Coating or dwell time required is approximately 20 seconds, curing or baking time about 30 seconds, the mechanical cycle 40 seconds, for a total of about 1½ minutes.

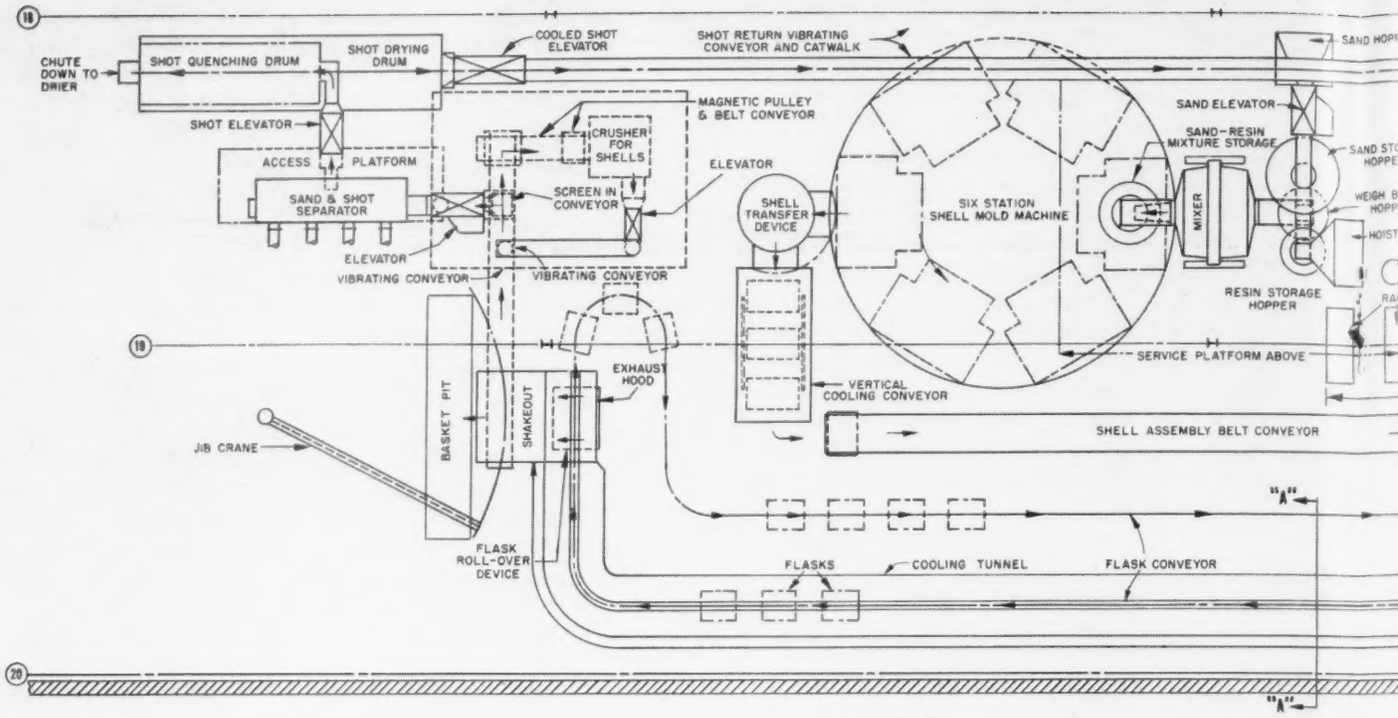
Two important features are to be added to this machine. These are an automatic sand-resin feeder to fill the sand hopper and a shell unloading device. This device will be arranged to remove the shell from above the hot pattern to a location adjacent to the machine, from where it will be handled manually or otherwise.

Sutter Products Co. has built seven turntable type shell making machines (pattern size, 26 x 41 in.) which are being used by a large motor company. Each of the seven turntables has six individual shell production machines mounted on it. The turntables, with their auxiliary equipment, ovens, etc., are approximately 25 ft in diameter. From the experience gained in the designing and building of these 42 machines, Sutter Co. has designed and built a self-contained single station shell producing machine. This machine will handle a pattern of 20 x 30 in. with a 3½-in. strip. The company also proposes to build a 20 x 36 in. machine with a stripping mechanism to suit the depth of pattern and a single station machine for a pattern size of 26 x 41 in. with whatever draw is required.

The ovens on all sizes can be gas fired or electrically heated. Arrangements will be made to permit auxiliary electric heating of patterns. The basic design for electric heating of patterns to be used on these machines has been established by Sutter Co. Floor space required is 8½ x 8½ ft.

The machine is powered by air cylinders. Automatic control is accomplished by a rotary drum actuating a series of air valves. Timing is accomplished by a variable speed motor drive to the rotary drum. The mechanical function of the machine requires 33 seconds for one cycle. Allowing another 57 seconds for coating and curing time, for a total of one-and-one half minutes, the maker expects to obtain 40 or more shells per hour.

Mechanical Handling Systems Inc. has designed and is building two rotary type shell producing machines. The small machine is a six-station unit which measures approximately 21 ft in diameter. The larger machine will have 12 stations and will be approximately 26 ft in diameter. Pattern sizes on both machines are 22 x 28 in. with an 8½-in. draw or strip. The ovens on both machines will be gas fired. Because the machines will be entirely powered by electric drives, no air will be required. An automatic sand-resin blending and feeding device to fill the sand



MOLDING UNIT

Size of casting to fit a shell mold ..... 5 x 18 x 20 in.
Production at 240 per hour for 14 hours .... 3200 avg. per day
Pouring time .... 15 sec. per mold
Cooling time in flask .... 25 min.
Approximate weight of casting with sprue ..... 26 lb
Casting weight with sprue per 14-hour day ..... 41.6 tons
Casting weight (approx.) .... 20 lb
Backing material, type and kind:
First choice ..... size G12 grit
Second choice .... size S780 shot

SHELL PRODUCTION

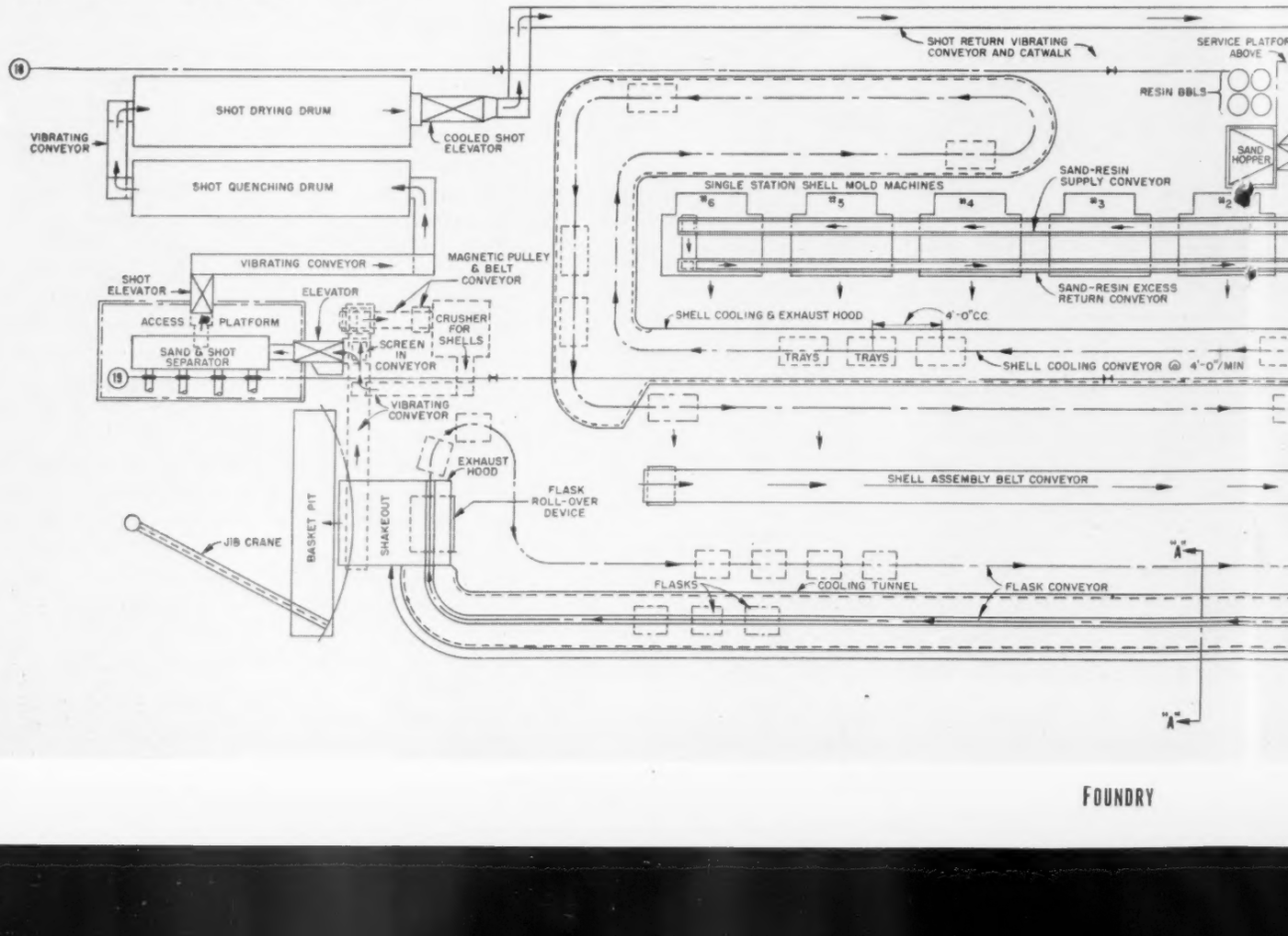
Each shell needs cope and drag:
Weight of shell ..... 22 lb
Shell size ..... 5 x 18 x 20 in.
Shell molds daily, avg. 3200
Half shells daily, avg. 6400
Half shells per hour 480
Half shells per min. 8
Weight of sand and resin per day:
3200 22-lb shells ..... 70,400 lb
Sand (approx. 94%) .. 66,200 lb
Resin (approx. 6%) ... 4,200 lb
Sand-resin mixing time ... 15 min.
Shell cooling time, from 500°F to 125°F ..... 20 min.

SHOT HANDLING

Weight of shot ... 270 lb per cu ft
Shot per flask ..... 6.62 cu ft
Shot per hour: 6.62 cu ft x 60 flasks per hour ..... 397 cu ft
Tons of shot per hour: 270 x 397 divided by 2000 ..... 54 tons
Cooling of shot or grit after removal of molds ... 700 to 150°F
Approximate amount of shot needed to operate the system at 1800 lb of shot per flask:
40 filled flasks ..... 36 tons
Shot in process ..... 36 tons
Total ..... 72 tons

FLASK

Flask size .... 20 x 22 x 26 in. ID
Estimated flask weight .... 650 lb
Weight of shot ..... 1800 lb
Bail and attachments .... 150 lb
Estimated total weight of the filled flask ..... 2600 lb
Shell molds per flask 4



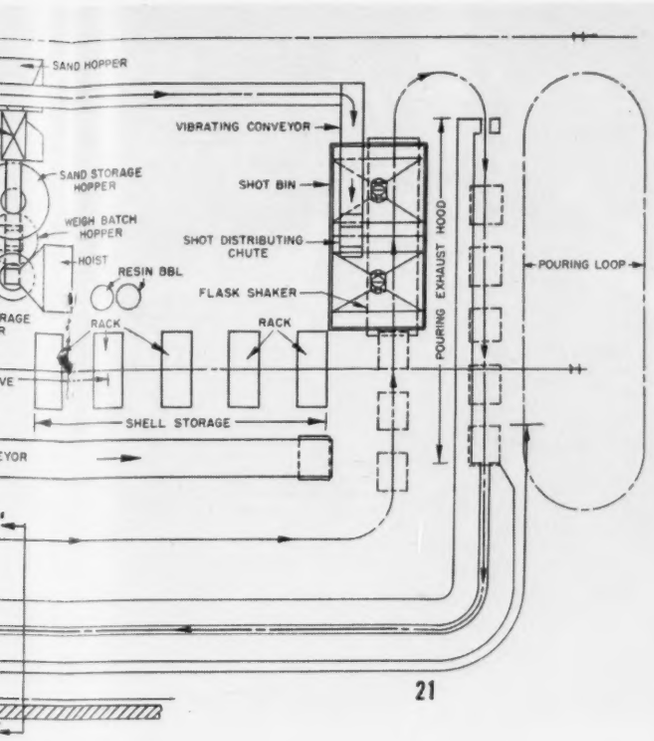
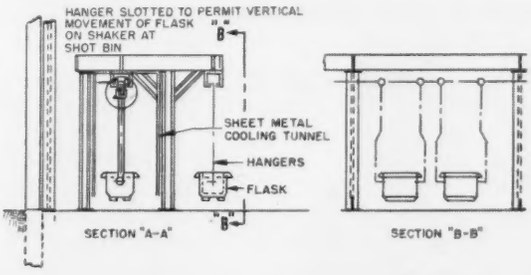
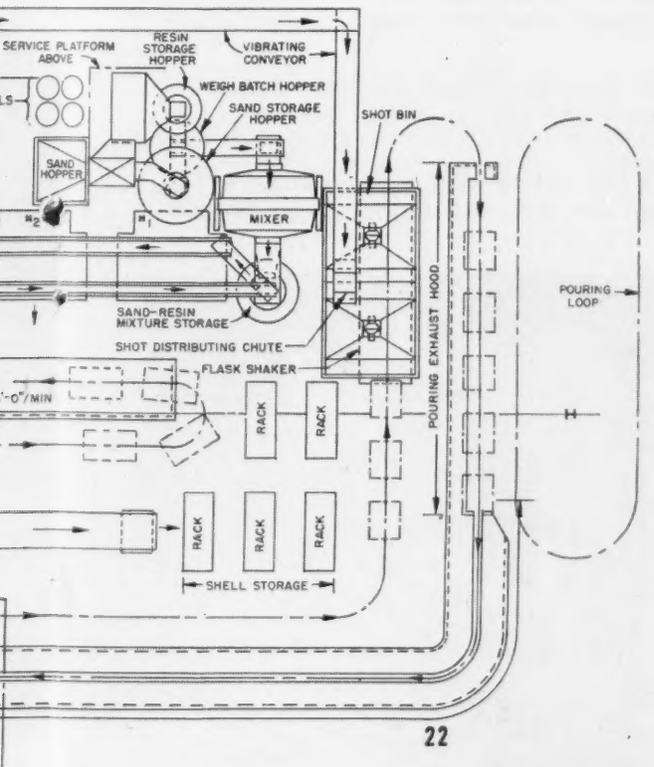


Fig. 20—The flask is filled with metal backup grit after four assembled molds have been placed in it

in. ID
650 lb
800 lb
150 lb
600 lb



Figs. 21-22—In proposed production layouts, Plan A (Fig. 21) uses rotary machine for high production of one item, and Plan B (Fig. 22) uses single-station machines to produce a variety of parts



hoppers and a shell removal device will be available optionally. The company also expects to design and build at a later date an auxiliary machine to assemble the shells automatically.

The six-station machine is expected to produce four shells per minute with a curing time of 30 to 45 seconds and a dwell time of 13 seconds. The 12-station machine is expected to produce eight shells per minute.

Osborn Mfg. Co. has designed and built machines with a pattern size of 20 x 30 in. and a draw or stripping arrangement of $\frac{7}{8}$-in. They are intended for rather shallow patterns. The oven is electrically heated and is moved over the pattern and away again by manual operation. The other operations are accomplished by air power through the use of air cylinders. These machines are not yet being offered commercially.

Winter Engineering Corp. has designed several machines—a single-station unit, a two-station rotary index machine, a four-station rotary index and four-station continuous rotary machine, and an eight-station continuous rotary machine.

Maximum pattern size for all machines is 30 x 40 in. with draw or length of stripping as required. Ovens are to be electrically heated. Patterns are also to be heated electrically and thermostatically controlled. Arrangements are to be made to water-cool the sand-resin hopper to prevent the formation of loose crusts of sand-resin on the hopper sides by heat transferred from the pattern to the hopper side. Arrangements have been provided to permit the easy removal of the operating heads in the event of trouble. A spare

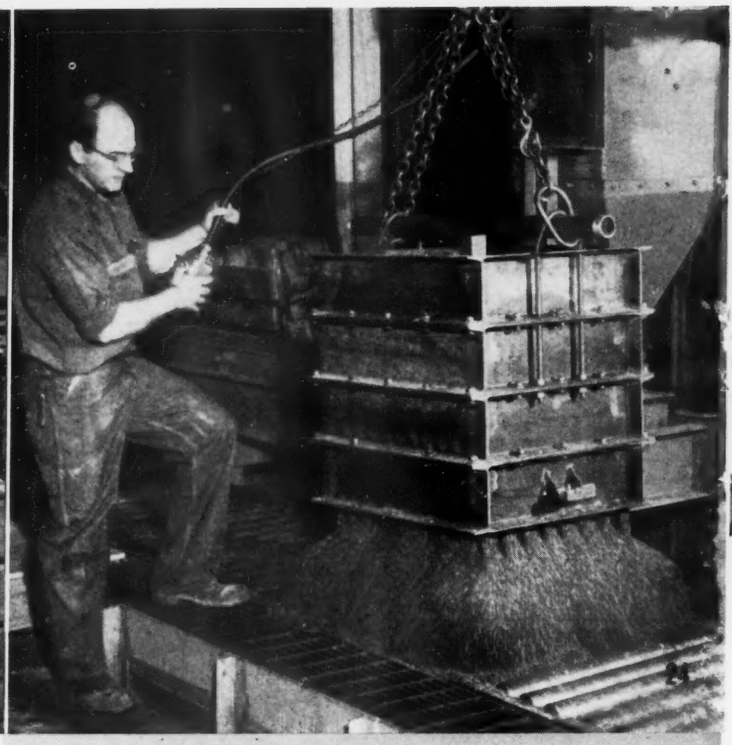


Fig. 23—After the molds and the metal grit have been placed in flask, shell molds are poured off

Fig. 24—When a flask is shaken out, metal grit pours from it. The flask is barred at the bottom

Fig. 25—Immediately after the shakeout, shells, castings and metal grit present this appearance

Fig. 26—These metal bars on bottom of flask retain shells and castings during shakeout of grit

Fig. 27—Top of flask which had bars added to bottom to retain shells and castings during shakeout

head can be installed with nominal effort. A majority of the operations will be powered by electric motors, although some air will be required.

The anticipated production of the various machines is as follows: One-station machine with 30 seconds curing time will produce approximately one shell per minute; two-station rotary index machine with 30 seconds curing time will produce approximately two shells per minute; four-station rotary index machine with 30 seconds curing time will produce four shells per minute; four-head continuous rotary machine with 30 seconds curing time will produce four shells per minute; six-head continuous rotary machine with 30 seconds curing time will produce six shells per minute; eight-head continuous rotary machine with 30 seconds curing time will produce eight shells per minute.

Econocast Inc. has built a rotary type machine for making shells. It is equipped with electric ovens, and the patterns also are heated electrically. We were informed that the Tabor Mfg. Co., Philadelphia, is going to design and build production machines based on Econocast's original model. Representatives of the Tabor Mfg. Co. advise that machines will be available sometime early in 1953.

We have been informed that the Robinson Co. built the first rotary type shell production machines for production of shells for automotive castings. The machines are arranged with nine pattern holding arms and are approximately 10 ft. in diameter.

Crown Casting Associates has designed and built an experimental model shell making machine. In this machine the patterns are mounted on a pair of endless chains. The chains carry the patterns through the various operations of coating, inverting, curing, stripping and applying of release agent to the patterns.

Shell-O-Matic Corp., a division of Newark Pattern Works, exhibited a machine to produce shell molds at the 1952 American Foundrymen's Society Convention. The pattern size on the machine shown was 12 x 18 in. with a ¾-in. draw. It was indicated that the draw could be increased. Curing oven is electrically heated. The machine is operated by air at 140 lb pressure, controlled by hand valves. An automatic timer operates a bell indicating when the manual air valves should be operated. We were informed that machines equipped for larger pattern sizes will be designed and built in the near future.

General Information—We have information that several other shell making machines have been built. These machines have generally been designed and constructed by the companies which plan to use them in the production of their own castings and for this reason are not available to the public. It is probable that many other molding machine manufacturers will design and build various types of shell making machines for various classes of castings.

The evolution of shell making machines may follow somewhat the pattern set earlier by conventional molding machines. Thus present day squeezer and jolt type machines were evolved over the years to produce certain classes of castings according to size, type and weight. Similarly it could well be that shell making machines will be designed and produced for certain size, type and weight ranges of castings.

The production of accurate patterns, such as glass fiber reinforced plastics, that are low in cost and that will produce a given number of shells before dimensional stability is lost, could well be the answer to the economical use of shell molds for production of limited numbers of castings. It seems very probable that relatively low cost shell making machines, perhaps not as completely automatic as most of those described above, will become available for this type of production.

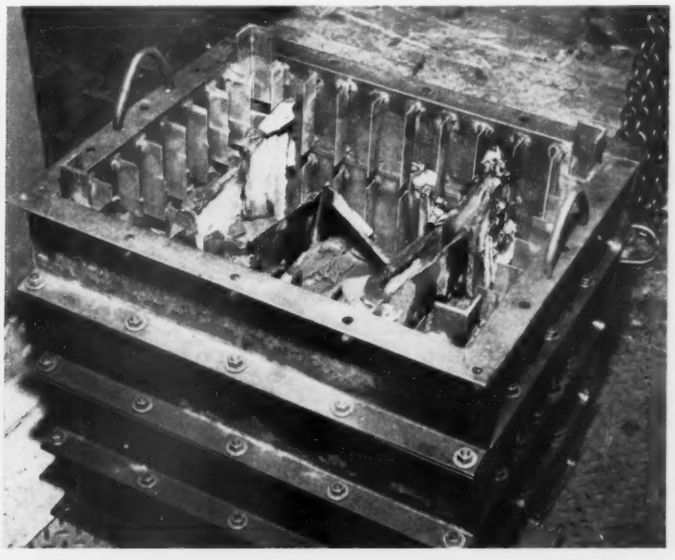
The possible development of precoated sand (sand coated with melted resin or resin in solution for the purpose of reducing the cost of the resin content) may result in a requirement for special equipment for coating sand.

There is a fertile field for development of production shell core making machines for both simple types of cores and for more complex ones such as jacket cores for cylinder heads and blocks. The use of conventional types of core blowers is impractical because of the tendency of the powdered resin to separate from the sand with resultant lack of bond in certain areas and segregation or buildup of bond in other areas. The design of "blowers" for current sand-dry powdered resin mixtures must be such that resin does not separate from a uniform mixture and must provide for quick removal of the excess sand-resin mixture from the hot metal core box. The use of precoated sand would overcome this segregation problem. The development of conventional types of shell core making machines presents numerous problems.

The development of practical mechanical equipment for removing various types of hot cured shells from shell making machines remains to be done. In many cases, to insure completely flat shell mating faces, it may be necessary to install a cooling station where hot shells will be placed on the mating face and loaded on the back side to assure flat mating surfaces when cool.

In other cases, the assembly of right and left or cope and drag shells to complete the molds will no doubt be mechanized for high production operations. The immediate assembly of hot shells means a minimum of fins on the castings since the shells are somewhat flexible while hot. It is probable that sealing together of the two mold mating faces may prove to be advantageous for certain castings of irregular contours to minimize casting distortion. Each shell will thus reinforce the other against the weight and pressure of the molten metal poured into the mold. This sealing can best be done when the shells are hot with the sealers currently available since those of which we have knowledge require heat to cause them to set.

Another phase of shell molding that may require mechanization to facilitate operation is that of properly packing backing material around and under overhanging shell molds. Simple pouring in of grit or vibrating of the flask containing shell molds while the flask is being filled (*Please turn to page* 177)



By ALBERT E. GROVER
Cost Consultant
Cleveland

Meeting Competition with

GOOD COST METHODS

In this first of two articles the author discusses the establishment of a basis for available working hours, and the analysis and distribution of cost elements. Preparation of estimating bases and calculation of job costs and selling prices will be explained next month

THE purpose of a cost system in a foundry is to analyze cost elements and to allocate them to specific operations. To be effective, the results of those allocations must be in suitable form for estimating costs to be used as bases for establishing selling prices and calculating actual costs of individual jobs. Too many foundry cost systems do not provide sufficient dependable data to do so.

Of vital importance to the individual foundry executive are the types of competitors who bid against him for business. Let us classify them:

1. The foundryman who does not know his costs and is frank enough to admit it.

2. The foundryman who does not know his costs, but thinks he does.

3. The foundryman who knows his costs and is in a position to know that he knows, having obtained this position by careful study of his costing methods to see that they are in keeping with sensible practices. Unless the cost system is based on sound principles, sales prices necessarily must be inaccurate and dangerous, not only to the individual foundryman, but to the industry as a whole.

A manufacturer of the first type necessarily must base his selling prices in accordance with those of his competitors. If the competitor who sets the selling prices is of the second type and has based prices upon cost knowledge of a questionable character, he will help to make a bad price situation worse.

Observation of cost systems employed in foundries indicates that not all the good ones are used by larger foundries. Many small operators, often believed to have inadequate systems, are using dependable ones. A great many small manufacturers not only are just as keen businessmen as the heads of larger organizations, but also are closer to the cost problems of their plants. These circumstances can make them better competitors than some chief executives in larger plants who must delegate certain managerial functions to under executives who may have not had the rounded business experience of the chief executive.

Wise management will enter competition only with a scientifically prepared basis for establishing a sales policy for each item to be produced, so as to be in position to select the work that is most profitable, considering the particular operating facilities used in its plant. Furthermore, to stay in business a company may be compelled to meet competition at a price that cannot possibly return a profit on its invested capital or even recover all of its fixed expenses.

The first objective of each foundry is profit, which results from sound price making and the elimination of wasted investment in plant facilities and operations.

Since these functions are advanced by cost comparisons within the industry, uniformity is necessary so that comparisons are possible. Like uniform systems in any other industry, a uniform system for foundries of each type (gray iron, nonferrous, malleable and steel) must be designed to fulfill these conditions. Such uniform systems will contribute to profit making.

They will present infor- (*Please turn to page* 256)

Fig. 1—Illustrating method of calculating number of available working hours for normal operations

ESTABLISHMENT OF NORMAL OPERATION

DAYS IN ONE YEAR		365
DEDUCTIONS		
HOLIDAYS — NEW YEAR		
— MEMORIAL DAY		
— INDEPENDENCE DAY		
— LABOR DAY		
— THANKSGIVING		
— CHRISTMAS		
TOTAL HOLIDAYS	6	
SATURDAYS	52	
SUNDAYS	52	
VACATION ALLOWANCES	10	
ALLOWANCES FOR OTHER SHUTDOWNS	6	
		126
AVAILABLE WORKING DAYS		239
AVAILABLE WORKING HOURS		1912
NORMAL OPERATING HOURS		
10% ALLOWANCE FOR DOWNTIME	191 HOURS	1721
20% " " "	383 "	1529
30% " " "	574 "	1338
40% " " "	765 "	1147

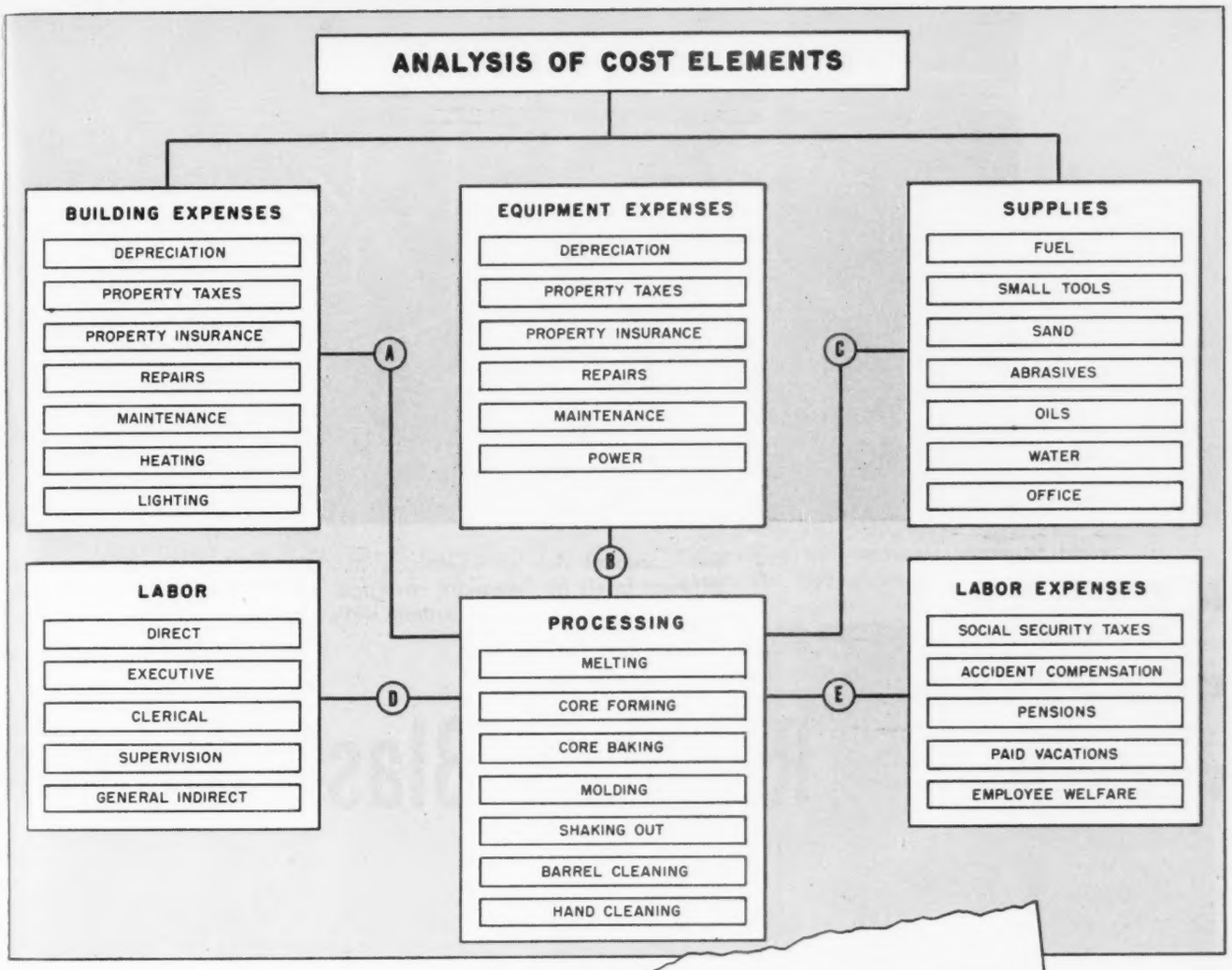


Fig. 2 (above)—Various elements which enter into production costs

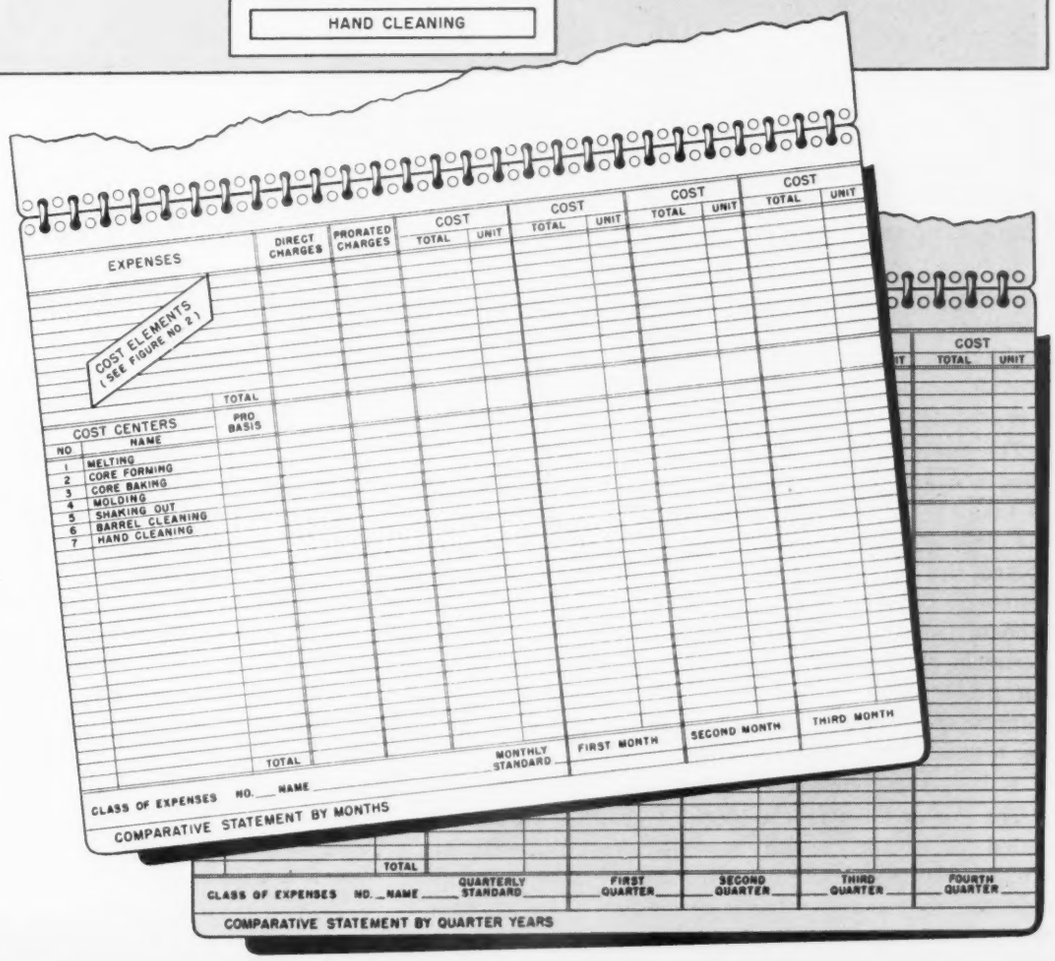
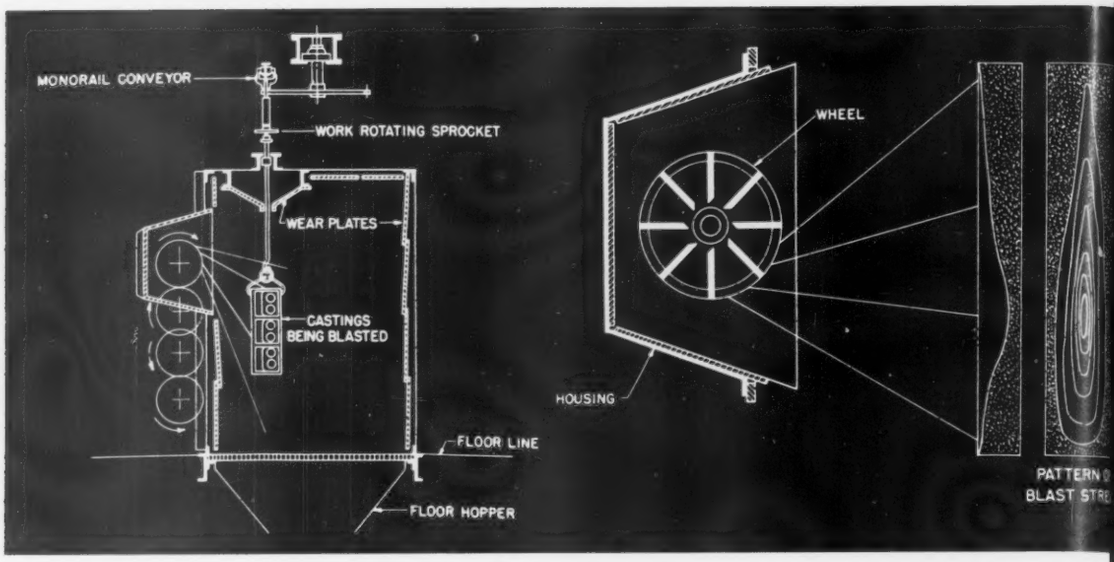


Fig. 3—Form used for establishment of normal operating costs. Single sheet is used for each class of expenses. Figures are shown by months. For quarterly comparison (Fig. 4) the similar sheet, right, is used



Left—Sectional view of monorail system shows blast wheels located at different levels for adequate coverage. *Right*—Abrasive throwing wheel has a fixed blast steam pattern while casting is rotated as required

MONORAIL CONVEYOR SYSTEM . . . Reduces Blast-Cleaning C

By W. I. GLADFELTER
Chief Engineer
Pangborn Corp.
Hagerstown, Md.

HOW to blast-clean castings at high production rates and low cost is a recurring problem of the foundry industry. Development of the monorail conveyor system of blast cleaning has been an important step in accomplishing this aim.

Monorail conveyor type blasting units have lowered cleaning cost, reduced floor space requirements and eliminated considerable manual handling. A labor problem is also eased since these conveyor units provide working conditions comparatively clean and free of dust.

The basic idea of the monorail conveyor was developed not only to speed cleaning of castings but also to take the foundry worker out of the room in which the actual blasting was done. Early attempts involved the installation of a slow moving continuous conveyor through the sand blast rooms arranged in tandem fitted with vestibules and swinging doors or curtains. It was still necessary for the worker, wearing protective clothing, to work in the room using compressed air nozzles. This technique was slow, giving a production rate of only 20 to 25 pieces per hour of a typical product, automobile cylinder blocks.

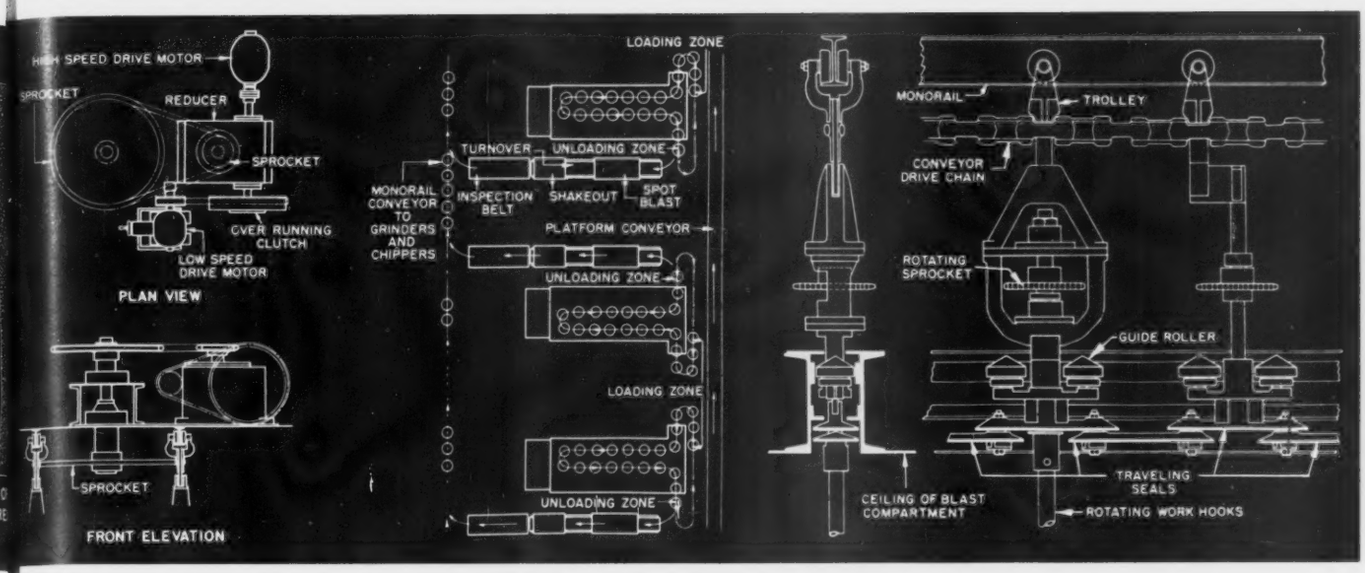
The demand for motor blocks and other cast parts called for equipment that would thoroughly clean intricate castings at high speed without using men inside the rooms and without occupying valuable floor space to provide banks of castings before and after the cleaning operations.

Cleaning castings while they hang from a conveyor seemed the logical method. One of the first automatic blast installations in which motor block castings are hung on a power-driven monorail conveyor used compressed air as the blasting medium. Power costs and the size and first cost of air compressors and motors make compressed air jobs too expensive for the average foundry.

However, the abrasive throwing wheel makes possible wider application of continuous monorail blast units. Using 20 to 25-hp motors and running at a peripheral speed of approximately 11,000 fpm, the wheel throws from 400 to 500 pounds of abrasive per minute at a velocity approximately equal to the velocity imparted through a nozzle by 80 pounds of air pressure, (approximately 240 ft per second).

The wheel blast pattern is usually fixed and not manipulated as was customary with an air nozzle. To use throwing wheels it is necessary to have the work conveyor move the casting in such a manner that all surface areas of castings are exposed to the stationary pattern of the blast streams. It may be necessary to use from two to seven wheels per installation and locate them at different levels to cover all surfaces of a long casting.

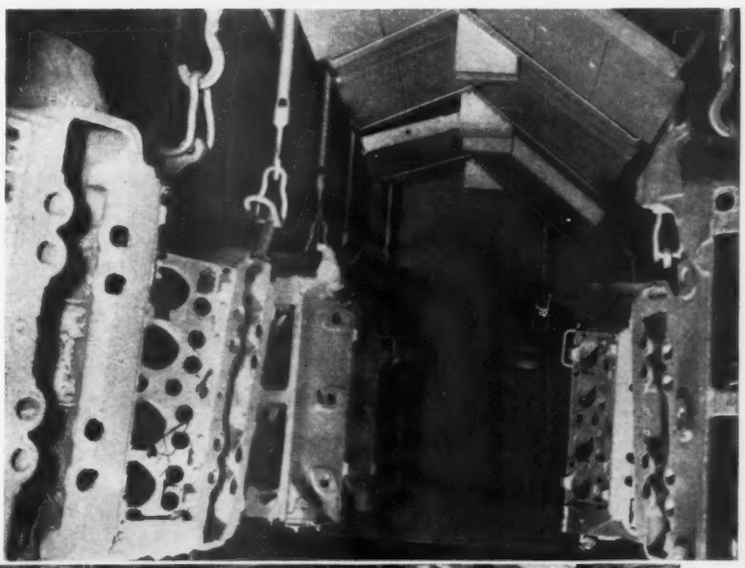
In some early monorail installations the conveyor ran straight through the (*Please turn to page* 263)



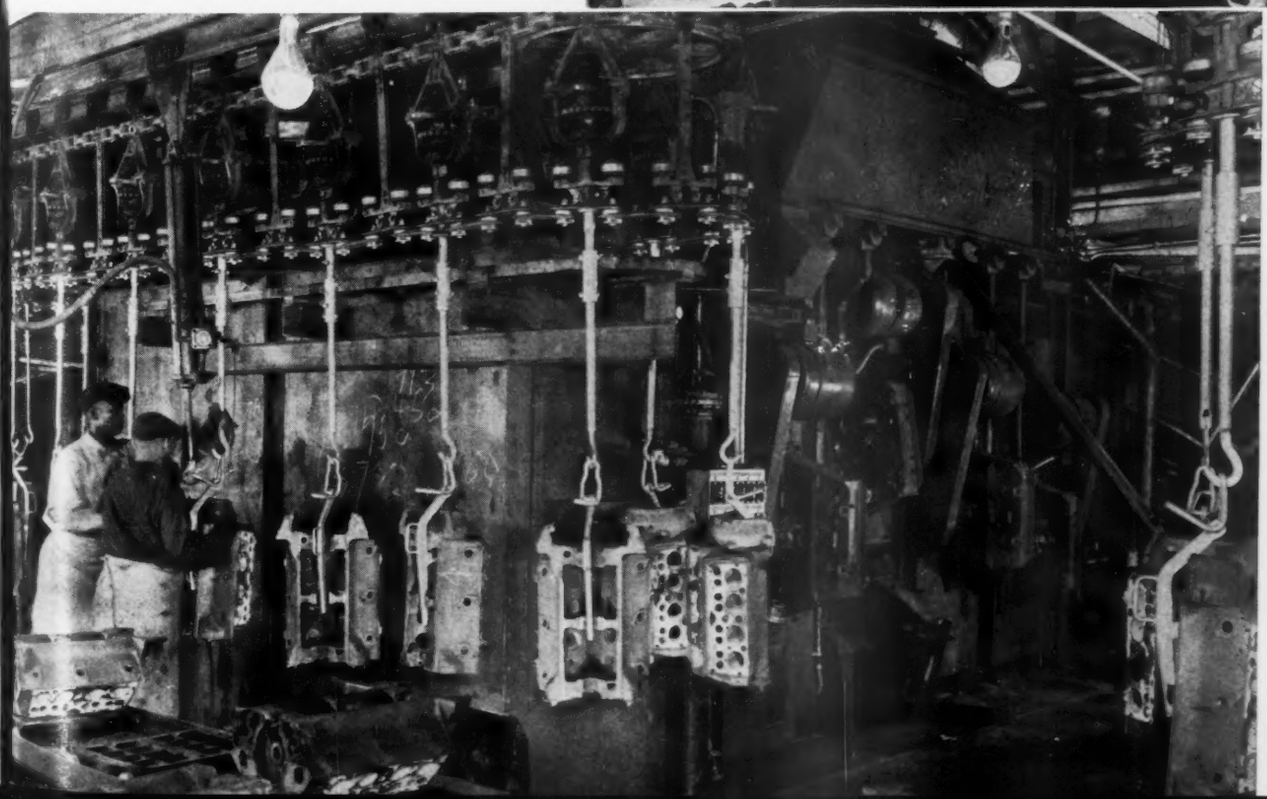
Left—Diagram of a two-speed conveyor drive
Right—Layout for cleaning cylinder blocks

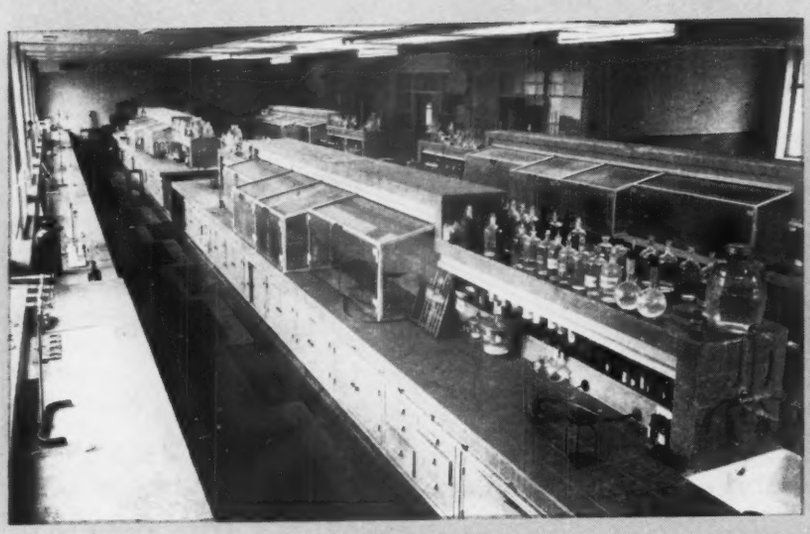
Traveling seal prevents waste of blast material through roof of conveyor unit

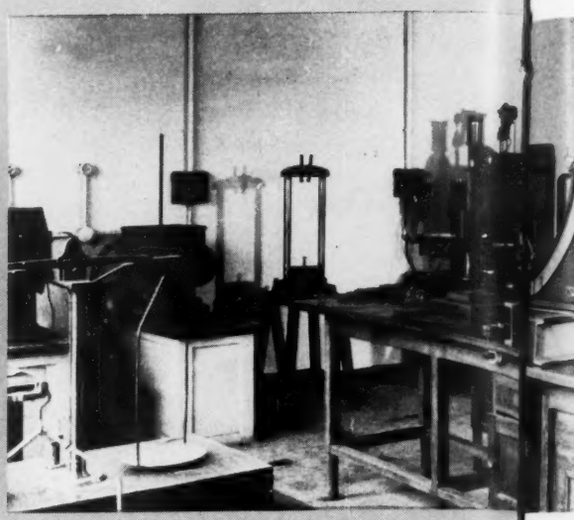
Costs



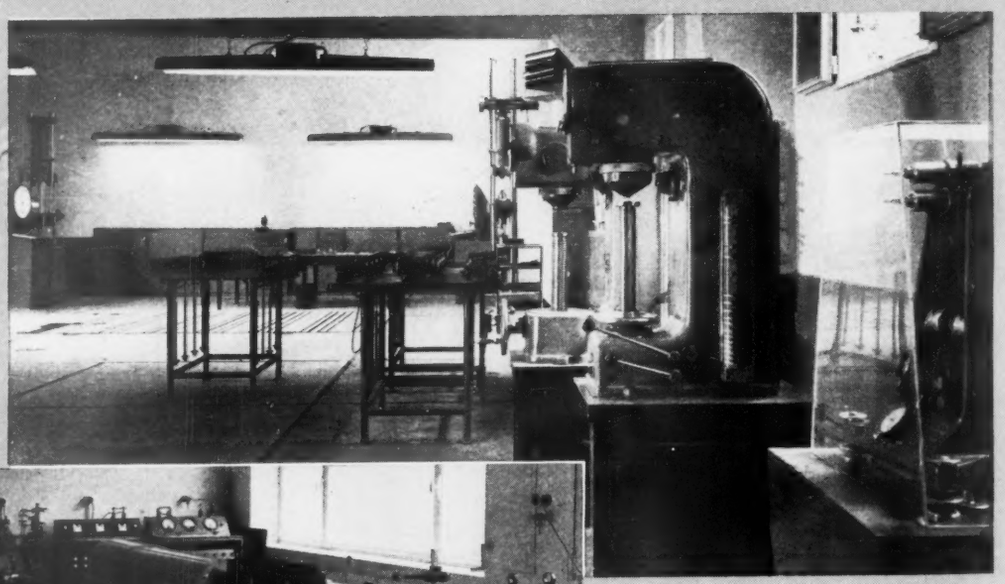
Right—Interior of blast cleaning cabinet, showing revolving dirty cylinder blocks entering at left, cleaned castings leaving at right. *Below*—Blocks being taken from the conveyor table and placed on monorail hooks before being conveyed into the blast cabinet





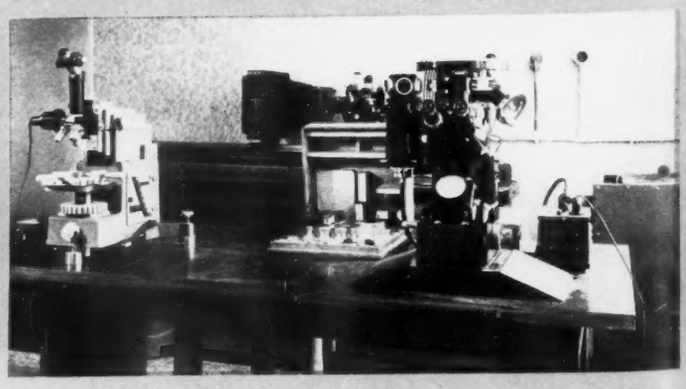


Above—Partial view of the chemical laboratory. *Right*—Section devoted to mechanical testing work

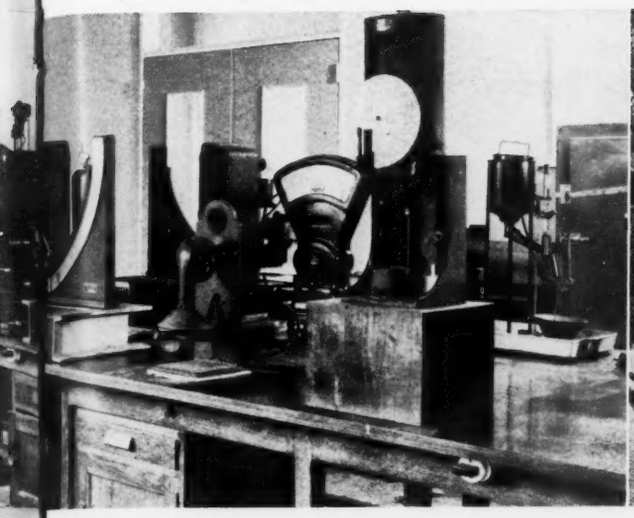


Left—Facilities in the spectrographic section

Machine tools for preparing test pieces



Micrographs are prepared in this department



One section of the sand testing laboratory

Main entrance to the Technical Center's new laboratories

FRENCH FOUNDRY CENTER

Completes Extensive Laboratories

By VINCENT DELPORT
European Manager
FOUNDRY

PROBABLY no country in Europe or elsewhere makes available to its foundries through one organization the facilities and services that are offered to the French foundry industry by the Centre Technique des Industries de la Fonderie. This organization was founded in 1942, despite the disruption caused in France by war and enemy occupation. Presiding at the birth of the Centre Technique were Pierre Ricard, now president of the organization, Maurice Olivier, a present member of the council, and A. E. Le Thomas, who has filled the post of director since its creation.

Ten years elapsed between the modest beginnings of the Centre Technique and what is probably its crowning achievement, the completion of the extensive laboratories installed at Sevres, just outside Paris, and officially inaugurated on June 25. The importance of the event was marked by the presence of the French premier, Antoine Pinay, who conducted the formal opening. In doing so, he emphasized the national interest of such an organization, which ensures product quality and plays an outstanding part in the development of technical progress in the foundry industry.

The buildings of the new laboratories cover 43,000 square feet and are situated in agreeable surroundings, within their own parkland. They were built for their specific purposes, advantage having been taken of the latest developments in architecture, construction, lighting and ventilation. The work performed in these laboratories is divided between five departments: Chemistry, physics, foundry sands, thermic tests, and experimental work, for which a model melting section has been provided. Melting equipment comprises one 20-in. cupola, crucible furnaces for nonferrous alloys, electric furnaces for metallurgical research and a 10-in. experimental cupola.

Activities at the laboratories cover technical and scientific research and routine control and testing of foundry practice involving gray iron, malleable iron, steel and nonferrous metals, as well as the study of sands, refractories and finishing processes. The latter include vitreous enameling, electrolytic coverings and others. A special section is devoted to the testing of domestic heating appliances, which receive a 'label' or certificate of efficiency when they have passed the required tests. Thanks to this section, it is claimed, the efficiency of these appliances has been increased from about 40 per cent before the war to 70 and 80 per cent.

Equipment installed in the laboratories is of the latest design and construction. In the chemistry department a special room is devoted to electrolytic studies, another to the use (*Please turn to page* 263)

Longer Life Cast Into

MODERN SLAG LADLE

ALTHOUGH the basic feature—the corrugated wall—is retained in the modern steel cinder or slag ladle, many changes and improvements have been added since the Johnston-type ladle was designed and first cast at the plant of the Mackintosh-Hemphill Co., Midland, Pa., in 1934. The Johnston patent was prompted by the belief that a corrugated container would expand and contract with greater freedom than a container with plain, straight sides. The ladle is exposed to severe thermal shock when it is filled with molten slag. Between trips, especially in winter, it is exposed to frost, ice, snow, hail and rain.

In 1935 a method was devised for measuring and determining the temperature, temperature gradients and rates of heat transfer through cinder pot walls and radiation from them. It was found that corrugations permit pot walls to expand and contract freely and provide more surface to dissipate heat rapidly. In 1938 a new type of crane hook attachment was developed to enable the crane operator to handle and dump, safely and without assistance, open-hearth cinder pots mounted in crane dump cars.

During the following year a method of supporting cinder pots in bail rings was developed to supplant the almost universally used *feet*. Lugs are cast on the coolest and strongest part of the walls near the bottom. Brackets that embrace the ring and support the pot by suspension are attached to these lugs. Copper coating on the inside bottom, another patented feature, was introduced in 1940. This coating prevents entrained metal from fusing with or adhering to the bottom of the pot. An expansible rim was first used in 1951 to keep the top of the pot in truly circular shape. Also in 1941 a cradle for end dump cinder pots was announced.

In 1942 considerable reduction in solidifying time in the open-hearth department was secured by providing an air-cooled base for open-bottom cinder pots. The convex, curved side of Johnston cinder pots was patented in 1946. This novel feature, it is claimed, retards inward thermal creeping of the walls without

Fig. 1—Dimensions of new wooden pattern for Johnston-type cinder pot are checked in the pattern shop. Fig. 2—Air rammers pack mold sand to form the core. Fig. 3—Silica facing sand covers all pattern surfaces, inside and outside. Smaller diameter flasks will be used above this level

Fig. 4—After the ramming, cope half of mold is lifted off and pattern removed from drag half. The core is smoothed over and given a silica wash

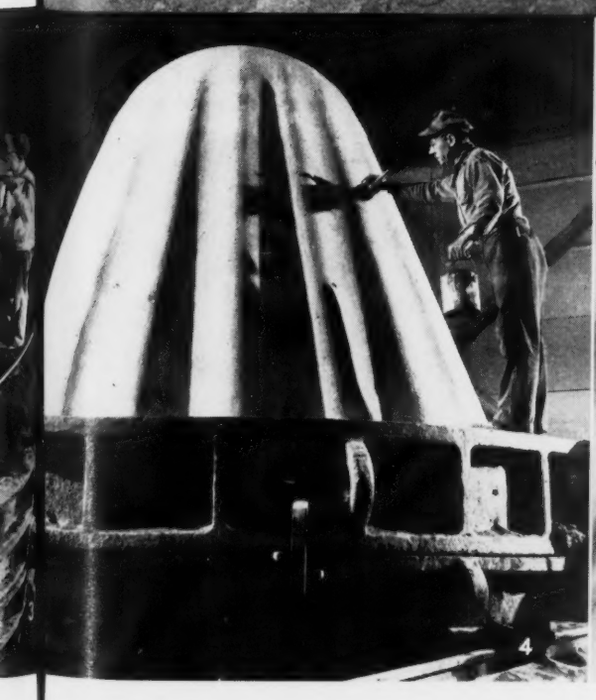


Fig. 5—As in all molds, the nails help to prevent sand erosion by molten steel, with a consequent penetration into the sand

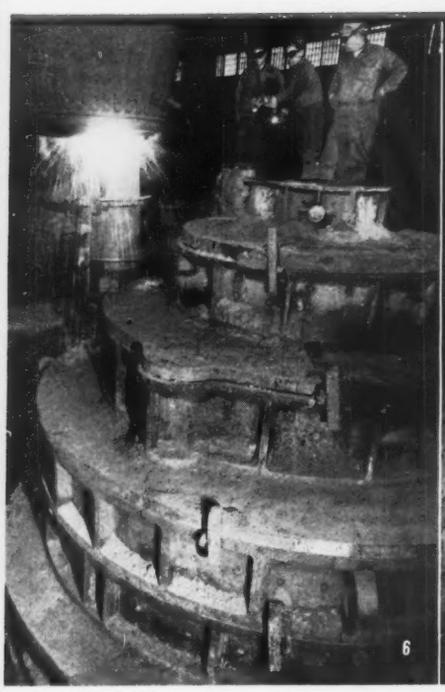


Fig. 6—Pouring of steel into mold takes only two to three minutes. Fig. 7—Flasks are usually removed from castings in about 24 hours. Overhead, traveling crane does all handling. Fig. 8—Rough cleaning of the cinder pot castings is done with pneumatic chisels. At lower left are the gates

sacrificing other features and avoids use of overthick walls, which tend to crack and check because heat radiation is retarded.

Dimensions of a new wood pattern for the Johnston corrugated cinder pot are checked in the Mackintosh-Hemphill Co., Midland, Pa., plant patternshop before it is taken to the foundry. Patterns range up to 10 ft in height, with rim diameters up to 11 ft. The largest size, a 500-cu ft oval cinder pot, is 15 ft long and 10 ft wide at the top. Wall thickness varies with pot size, users' specifications and/or needs. A wide range in size of cinder pot patterns has met a large number of specifications differing principally in size, height and location and types of supporting lugs. Several construction details are shown in Fig. 1.

The pattern is designed to be molded in the position shown, or in the opposite position to that assumed by the casting in service. Therefore, the core or inside part of the mold rests on a comparatively shallow drag, and the outside part of the mold is formed in a cope made up of ring flasks tapering from the largest at the bottom to the smallest on top. They are built up as the ramming progresses and are clamped together to be lifted on and off as a unit. See Fig. 6

The mold foundation plate is set up level in the

Fig. 11—Inside surface of dome is ground smooth in preparation for copper coating. Casting does not require machining. Fig. 12—Copper coating to prevent sticking of material is applied by metallizing. Fig. 13—Rims are band sawed at centers of corrugation openings to permit thermal expan-

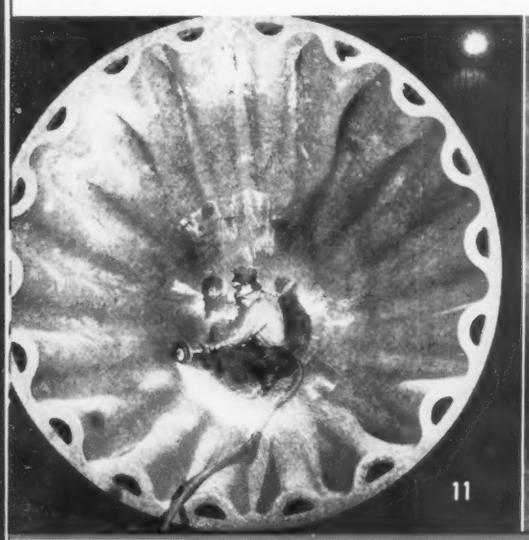


Fig. 9—Riser is burned off with an acetylene torch. Remaining stub is ground off to contour of pot by powered hand grinding wheels. Burned off gates are lying at lower right. Fig. 10—Annealing operations for internal stress relief take about a week. Curved walls improve strength

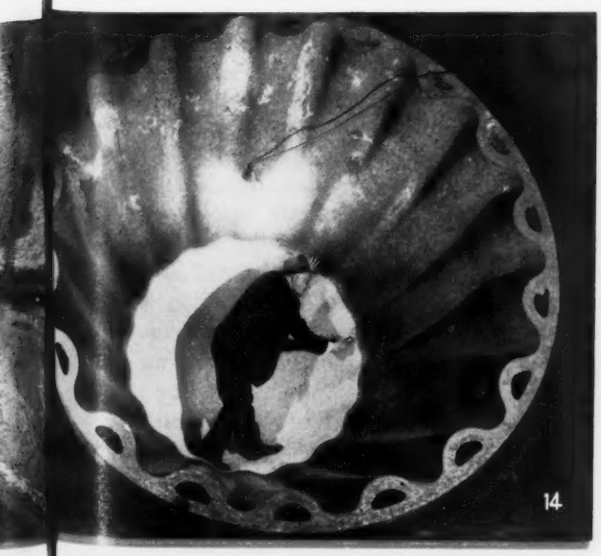
bottom of one of the foundry pits. A hollow steel cone approximately 2 ft less in diameter and height than the pot pattern, is centered and bolted to the plate. The cone is provided liberally with vent holes. It serves not only as a core arbor, but also as an important factor in reducing the amount of sand and labor involved in making the core, and also reduces the time required to dry the core in the oven. Ordinarily, sand is rammed inside and outside the pattern at the same time.

When the pattern is lowered into place on a prepared sand bed in the drag, the upper edge of the rim is flush with the upper face of the drag flange. A flat parting is made all around; then the first flask in the core assembly is placed on the drag. This flask section is provided with short jet or chuck bars to carry the anticipated load. The parting area is covered with a thin layer of facing sand and gaggered in the usual manner. A thickness of facing sand is laid up against the pattern. The remaining space in the first cope ring is filled with backing sand, firmly rammed. A heavy ring plate is bedded on top, followed by another and smaller cope flask, filled with rammed sand. Other plates and rings, gradually smaller in diameter, are added until the entire pattern including a riser 12 in. in diam and 18 in. high is enclosed in sand.

As shown in Fig. 1, a number of feet, brackets or lugs are attached with long wood pins to the main pattern. These additional parts are designed to hold the pot casting in place in the bail mounted on railroad trucks, when the cinder pot is in service. In the process of making the mold, the molder removes the pins when a sufficient amount of sand has been rammed around the part to hold it in place. After the cope has been lifted off the drag, the molder draws the loose pieces in horizontally. The patternmaker attaches the parts properly in the first place. Ample identifying marks enable the foundryman to reassemble the pattern, if necessary, for subsequent molds.

The pattern is in three parts to facilitate ramming sand on the inside, instead of the awkward alternative of mounting the pattern in a cradle, a giant follow board, ramming core and drag and then rolling the assembly over as a unit. A man on the inside of the pattern rams sand between the central cone arbor and the inside wall of the pattern. When the sand has been rammed approximately to the top edge of the main pattern, the (*Please turn to page* 174)

sion and contraction without permanent distortion. Fig. 14—Careful inspection precedes shipment. Pots are shipped in inverted position on flat cars



QUESTIONS

Small cupola plans
Enameling bathtubs
Wants cupola lining gun-mix and shell molding data
Red iron oxide in cores
Sand distribution

Wants to Make a Small Cupola

QUESTION We wish to construct a small cupola with an inside diam of 20 in. and a melting rate of about 2000 lb per hr. Air would be supplied by running a branch from our blower, which at present supplies air for a 36-in. ID cupola. Particulars of the blower are: No. 6E Buffalo blower with 15-hp motor, 3600 rpm. We would appreciate receiving plans including height of stack, linings, tuyeres, etc.

ANSWER For detailed information relating to construction and operation of the cupola we suggest you obtain a copy of the *Handbook of Cupola Operation.*

However, briefly it might be pointed out that it is advisable to select a standard size cupola—that is, one lined either to 18 or 23 in. to meet your requirements of 1 ton per hour. The selection will depend upon your coke to iron ratios, and the 18-in. diam cupola is rated to melt ¾-ton per hour at a 1:6 and 1 ton at a 1:8 ratio, while the 23-in. diam melts 1 ton per hour at 1:6 and 1½ tons at 1:8 ratio.

Linings in these small cupolas are 4½ in. thick so that the shells are 27 in. in diam for the 18-in. diam cupola, and 32-in. for the 23-in. diam cupola. Tuyere area for the 18-in. cupola is about 32 sq in., or two tuyeres 4 x 4 in., while for the 23-in. cupola the area is 85 sq in., or four tuyeres 4½ x 5 in. Height of the tuyeres above the sand bottom will depend upon the amount of iron to be held in the well, and usually is figured as two charges. In the case of the 18-in. cupola the recommended charge is 160 lb, and in case of the 23-in. cupola 280 lb. Hence, with the 18-in. cupola the bottom of the tuyeres should be 12 in. above the sand bottom, and with the 23-in. cupola about 13 in.

Recommended stack height is 15 to 18 ft to enable the descending cold iron charges to abstract as much heat as possible from the ascending gases of combustion. Air requirement for the 18-in. cupola

Cupola dimensions usually are based on desired melting rate

is 570 cfm, and 940 cfm for the 23-in. cupola. While your present blower can easily take care of such capacity—assuming that it supplies only one cupola at a time, you will have to insert a blast gate in the branch line to reduce the air supply to the desired amount.

While we do not know definitely, we believe your 36-in. cupola melts around 5 tons per hour requiring 2500 cfm, and it is a considerable waste of power to develop that capacity and choke it down to supply say 600 or 1000 cfm. If the blower is belt-driven, you probably could reduce the power demands to some extent by changing pulleys to operate the blower at a slower rate, but it would not be anywhere as efficient as a blower and motor of the proper sizes.

Obtain Good Enameling Coating

QUESTION We operate a foundry in Mexico, and are considering production of porcelain enameled bathtubs. We are interested in knowing why the mold faces cannot be blackened to give a good peel and smooth surfaces, and how the sand can be treated to provide these characteristics. Also, why must the sulphur be so low? Why desulphurize when the higher sulphur could be counteracted by increased manganese? Perhaps there is some other factor causing enameling trouble, and if so how is it overcome?

ANSWER Essential difficulty in enameling is that the enamel does not adhere to graphite or other carbonaceous material nor, apparently, to exceptionally slick surfaces those materials sometimes generate. Usual abrasive blasting of casting surfaces does not appear to remove all of the graphite. In addition, the iron composition must be such as to preclude chilled surface areas or edges, since they tend to break down under enameling temperatures, giving off CO-CO_2 and causing bubbles in the enameled surface.

As far as good peel is concerned, it is not necessary to use blacking or seacoal. Just see that the sand is refractory enough to withstand the temperatures involved. Smooth surface depends primarily on sand grain size and distribution, and one has to compromise between permeability and fineness. One foundry uses a sand having a permeability of 60 to 70 and a moisture content of 4 per cent.

We cannot suggest any definite reasons why sulphur is detrimental except for the intimation that it promotes porosity, brittleness and

ANSWERS

weakness in the iron, and a possibility that iron sulphide or iron-manganese sulphide breaks down under enameling temperatures to form sulphur dioxide. However, Krynitsky and Harrison, *Transactions*, American Foundrymen's Society, 1930, indicated that this did not occur so far as they could determine, and also mentioned that high manganese was considered detrimental.

According to one reference, the British at one time employed sea-coal and/or coated the molds with graphite to obtain a smooth surface with attendant difficulties in enameling. The trouble was overcome to a large extent by abrasive blasting, annealing at temperatures about the same as for enameling, and then blasting again to remove the scale, etc.

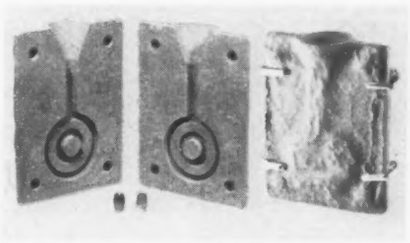
Wants Variety of Information

QUESTION We will appreciate information on the following: 1. A lining material for the cupola to be applied by a spraying pistol and harden rapidly for lining or repairing such furnaces. 2. Tools for ramming the monolithic furnace lining. 3. Molding sand with a plastic resin component, melting by pressure or heat, giving thus a smooth surface to the casting.

ANSWER Almost all the firms supplying refractories to the foundry industry in this country make suitable materials for applying to the cupola as a monolithic lining. These are termed "gun" mixes, and are projected against the cupola wall by means of a special unit employing compressed air as the propellant; it is commonly called a "cement gun."

We understand that in these units, the dry refractory mix is placed in the container and blown out through a hose to a nozzle where it is mixed with water and thence on to the wall. Since only enough water is added to make the mix slightly plastic, the refractory mix is much dryer than would be the case when rammed by other means. Hence, such mixtures would tend to dry faster.

Your third question seems to indicate you are referring to what we term "shell" molding wherein a dry resin-sharp sand mixture is placed on a heated metal pattern and allowed to remain a few minutes. Then the excess, unaffected sand is removed, and the pattern and sand shell (about ¼-in. thick) is placed in an oven for a few minutes more. This polymerizes or hardens the resin-sand mix shell, whereupon it is removed from the pattern. Two half-shells are fastened together by clamps, bolts or adhesives and form the mold. A rather detailed description of the process was published in the June, 1952 issue of FOUNDRY.



Two half molds fastened together comprise the mold at the right

Oxide Increases Hot Strength

QUESTION Have you any information on the use of iron oxide to benefit the core sand mix and to give hot strength?

ANSWER Red iron oxide to the extent of 1 to 2 per cent is used in core sand mixtures by many foundries to increase hot strength. Dietert in his book *Foundry Core Practice* points out that additions of 2 per cent oxide to a mixture increases collapsibility at 2500° F from 3 minutes and 14 seconds to 5 minutes and 30 seconds, and that such addition helps to reduce fissures or fins on cored surfaces of castings.

Morey and Ackerlind, *Transactions* of the American Foundrymen's Society, 1950, state that iron oxide raises strength of sand at nearly all temperatures and raises the temperature at which maximum strength occurs by nearly 100° F. At temperatures above 2000° F iron oxide causes a large increase in strength; from 2300 to 2500° F it amounts to 700 per cent.

Sand Shows Poor Distribution

QUESTION In making red brass castings weighing from a few ounces up to 12 lb, we are using sand which shows a permeability of 6.5, moisture 7.6 per cent, and green compression strength 7.3 psi. The screen test is as follows:

No.	Retained
40	0.8
50	5.0
70	13.0
100	12.0
140	6.0
200	5.2
270	5.0
Pan	39.0
	86.0
Clay	14.0
	100.0

AFS Fineness 183

We believe that this sand is a little on the coarse side and would appreciate your comments.

ANSWER For the average brass foundry the indicated grain fineness hardly would be termed on the coarse side but rather the opposite. However, we believe that, instead of considering the fineness number, you should note that you have poor grain distribution — about 25 per cent on the 70 and 100 mesh sieves and 40 per cent on the pan. It would appear to us that this sand might lead to difficulties with high expansion, decreased flowability and high hot strength with trouble from washing, scabs, buckles, etc.

You probably would be much

QUESTIONS ? ANSWERS

better off if you could obtain a sand with around 50 per cent of the grain on the 140 and 200 mesh sieves. High pan material, while increasing the fineness number, serves the purpose of filling the voids between the coarser 70 and 100 mesh grains, but it will not work as satisfactorily as, for example, sand on the 140, 200 and 270 mesh screens. The extremely fine pan material reduces permeability drastically, as indicated by the figure you give of 6.5. Also, sands containing large quantities of fines usually require more moisture to make them "feel" right to the molder. Such sands also tend to be "weak" since the fines have no bonding power, and tend to wash.

Heat Treating Grinding Balls

QUESTION For more than 15 years we have been producing cylpebs and balls in our foundry in Portugal for use in grinding cement, and are using low Si (0.6 to 1 per cent) with 0.5 per cent Cr. Recently we have tried to obtain better results from the product, and have made a number of experiments in a small mill in our plant. We already have concluded that higher carbons improve wear resistance. In this connection we saw in a large European plant that all the cylpebs and grinding balls were normalized in an old rocking, oil-fired furnace at 900°C and cooled in a pit covered with dry sand. Quality of the material is said to be excellent, and the metallography of the heat-treated balls or cylpebs shows a very regular cementite network in a pearlitic matrix. Composition of the balls is around 0.6 to 0.8 per cent Si with low chromium (0.2 to 0.25 per cent). What is your opinion on this heat treatment, and is it worthwhile; also for the small ones up to 2-in. diam? It is obvious that 3 or 4-in. diam balls not heat treated break in the mill.

ANSWER We believe that your inquiry as to heat treatment of the grinding balls and cylpebs provides its own answer in that excellent results are obtained — assuming that it refers to longer life. However, one should consider the economics of the situation before adopting the procedure. Heat treatment involves additional cost which should be reflected in the price to the consumer, and he hardly will be interested unless the increased life exceeds by a considerable margin the higher cost.

As far as the heat treatment is concerned, it probably provides a tougher ball which is less subject to a pitting or spalling action resulting from the impact of the hard balls on each other; an action that results in high wear rate. Attention also is drawn to the fact that recommendations for an alloy-type grinding ball include stress relief (all sizes) at 204 to 260°C for 3 to 4 hr.

Your mention of finding increased wear resistance with higher carbon content is somewhat at variance with work done by Ellis, Gordon and Farnham as reported in the *Transactions* of the American Foundrymen's Society, 1935. They made ball mill tests and reported that higher carbon (3.5 per cent) iron showed a greater wear than lower carbon (2.5 per cent) iron. However, others found the same results as you—but in other types of wear than ball mill grinding. We suspect that your reference to higher carbon does not cover the range indicated by Ellis, et al, and that would undoubtedly make a difference in the conclusions. Correct answer, of course, can only be determined by extensive field tests under usual operating conditions which may not be the same as under experimental conditions.

Gas in Iron Causes Pinholes

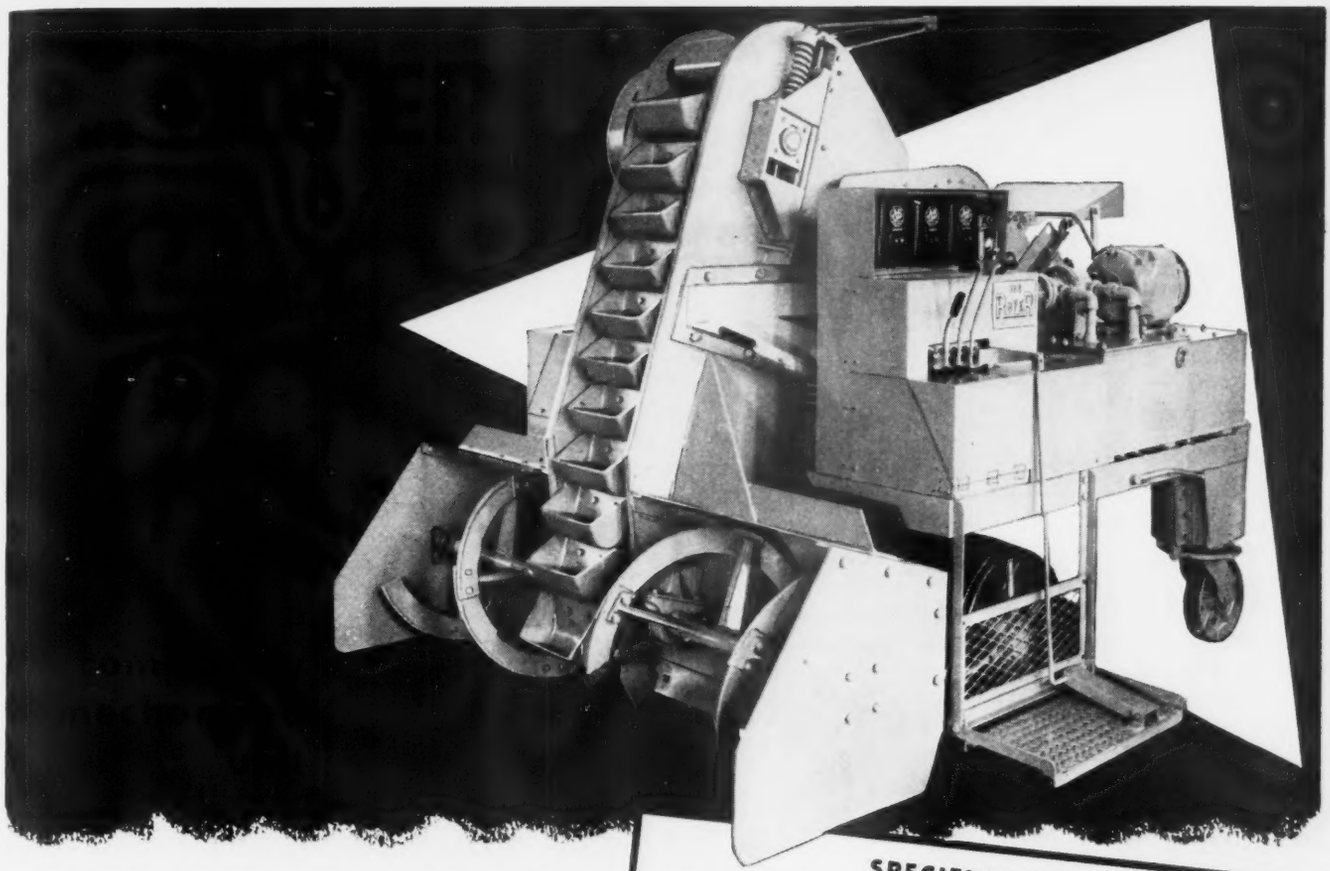
QUESTION We are sending you a sample bearing cap showing blow holes on the drag side. Similar defects are being encountered in a number of our small, heavy-section castings run on jolt-squeezer units. We do not experience this trouble on our slinger units. Iron used runs 2.00 to 2.10 per cent Si and 3.40 per cent TC. Spout temperature averages close to 2800° F. Sand is silica, 63 AFS fineness, bonded with western and southern bentonites, with 6 per cent seacoal, 1 per cent wood flour, and a small amount of cereal. Permeability is around 100, green compression strength 12.5 to 13 psi, and moisture 3.5 to 4.0 per cent. This defect appears periodically but has been most pronounced the past 30 days. We have attempted to reproduce this defect by hard ramming, wet sand, cold iron, etc., without success. Some of the castings have even a more cheesey appearance than the sample submitted; always on the drag side.

Small holes which show up on the drag side of bearing cap casting attributed to gas in the iron which collects just under the skin

ANSWER In our opinion, the cause of the small holes in the drag side of the bearing caps is gas in the iron. This was suggested by the somewhat bright appearance of the interior of the holes, although obscured to some extent by machining and exposure to the atmosphere. It was confirmed by fracturing, which showed elongated holes with bright smooth interiors just under the skin of the casting.

As you undoubtedly know, a gassy condition of the iron may arise from several sources such as damp ladles or cupola spout, and to the bed burning away. Perhaps your pouring men may follow the

(*Concluded on page* 116)



The Royer SAND HOG is a fully mechanized, self loading and self propelled unit . . . capable of supplying from 40 to 60 tons of properly prepared molding sand per hour. This hydraulically powered machine, operated by one man, travels to the sand heap wherever it may be, eliminating costly handling and hauling of the sand. It moves into the heap, scoops up and completely conditions the sand and discharges it from the rear, free of all trash and contamination. Magnetic separation removes all scrap, nails and shot . . . often eliminating the need for riddling.

The conditioning operation produces perfectly prepared sand . . . thoroughly blended and mixed, with even distribution of moisture, completely aerated . . . ready for the molders' use.

The SAND HOG is extremely maneuverable . . . travels at variable speeds from 1' to 85' per minute, turns in a radius of 5½', travels over a 30" windrow of sand with scraper and screw hydraulically raised. Speed changes are rapid with instantaneous reverse.

Write for more complete details on this latest production increasing machine.

SPECIFICATIONS

Overall Dimensions

Height — Operating	7'5"
Height — Traveling	8'11"
Width	7'
Length — Operating	8'
Length — Traveling	8'8"

Power

Total Horsepower	15 HP
Main Drive	5 HP
Bucket Line & Magnetic Pulley	5 HP
Royer Sand Separator	5 HP

Speed Range

Forward & Reverse Variable
0 to 15' per min. in low
65' to 85' per min. in high
Turning radius — 5½'

Miscellaneous

24" diameter screw — 7' wide.
Steel bucket line chain.
Flint rim bucket line sprockets.
Magnetic pulley — 15" diameter.
22" long.
Net weight approx. 11,000 lbs.
Shipping weight approx. 11,300 lbs.

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Foremost in Sand ROYER *Conditioning Equipment*

ROYER FOUNDRY & MACHINE CO. 159 PRINGLE ST. KINGSTON, PA.

QUESTIONS ? ANSWERS

(*Concluded from page* 114)

common practice of mudding up the lip of the ladle from time to time as it becomes eroded from knocking off the slag, etc. Steam generated by the first hot metal over such a patch will be picked up by the iron and carried into the casting.

If the casting section is fairly thin, freezing occurs rapidly enough to hold the gas in suspension in finely divided state and uniform distribution, so that it does not show up. However, with heavier sections the gas collects in large bubbles and tries to escape to the surface, but is caught just under the thin solidified skin.

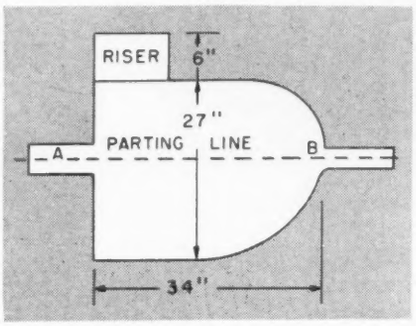
Bronze Rudders Cast on Edge

QUESTION We have on order a number of aluminum-bronze rudders and are not familiar with this alloy. Any advice on gating, risers and melting will be appreciated. Alloy contains 9.5 per cent Al, 5.5 per cent Ni, 4.5 per cent Fe, 1.5 per cent Mn, remainder Cu. Castings will weigh approximately 200 lb and are 27 in. wide at widest section, 34 in. on the longest. Thinnest part is $\frac{5}{16}$-in., increasing to about 1 in. where blade portion joins a heavy section 1½ x 4¼ in. across the top.

ANSWER Mold the rudder so that it can be cast vertically, with the thin edge at the bottom as indicated in the accompanying sketch. The riser should be one-third the length of the rudder, not less than 6 in. high, and should be as wide as seems practical. As soon as the metal rises in the mold above the castings it should be covered with a suitable insulating powder such as perlite or even ⅛-in. *dry* charcoal free from dust. The riser also might be surrounded with insulating material in the form of a sleeve.

Mold should be *dry* sand and the parting line should be as indicated along *A-B*. At *B*, where the metal enters, the mold edge should be rounded or curved to prevent eddies and turbulence when pouring. For the same reason the metal should be poured as slowly as practicable. Metal should follow the curvature of the mold to the bottom and gradually rise so that when the metal rises to the point of entry, it will be going into the heavy portion of the casting and then into the riser.

Suitable vents should be provided along the thin edge of the rudder to prevent entrapping air. Casting should be removed from the mold as soon as it has solidified and while it still is at a bright red heat, in order to avoid brittleness. To help rapid cooling the sand should be scraped off as far as possible while the casting is red hot.



Pour the rudder with thin edge down, place riser at heavy end

We assume that the ingot metal is of good quality of the composition indicated. It should be melted rapidly. No flux is used. Stirring should be avoided to prevent formation of dross. Pouring temperature should be 2150 to 2200° F, or lower if the metal will fill the mold. If a lower temperature is used, hot metal should be poured into the riser when the metal has risen about 2 in. above the casting to avoid development of dross in the latter. Having decided on the pouring rate, the sprue should be choked to enable the pourer to keep it filled during the whole pour. An oxidizing atmosphere should prevail during melting unless the metal is melted in an indirect-arc, rocking-type electric furnace.

Yield strength, if shaken out while at a bright red heat, should be about 45,000 psi and elongation 7 per cent, or as near to this as possible considering the difference between the casting and a properly fed test bar. If heat treated by soaking at 1600-1650° F and quenching in water with thorough agitation, then reheating and soaking at 1100-1150° F and again quenching in water, the yield strength should be 70,000 psi and the elongation 5 per cent.

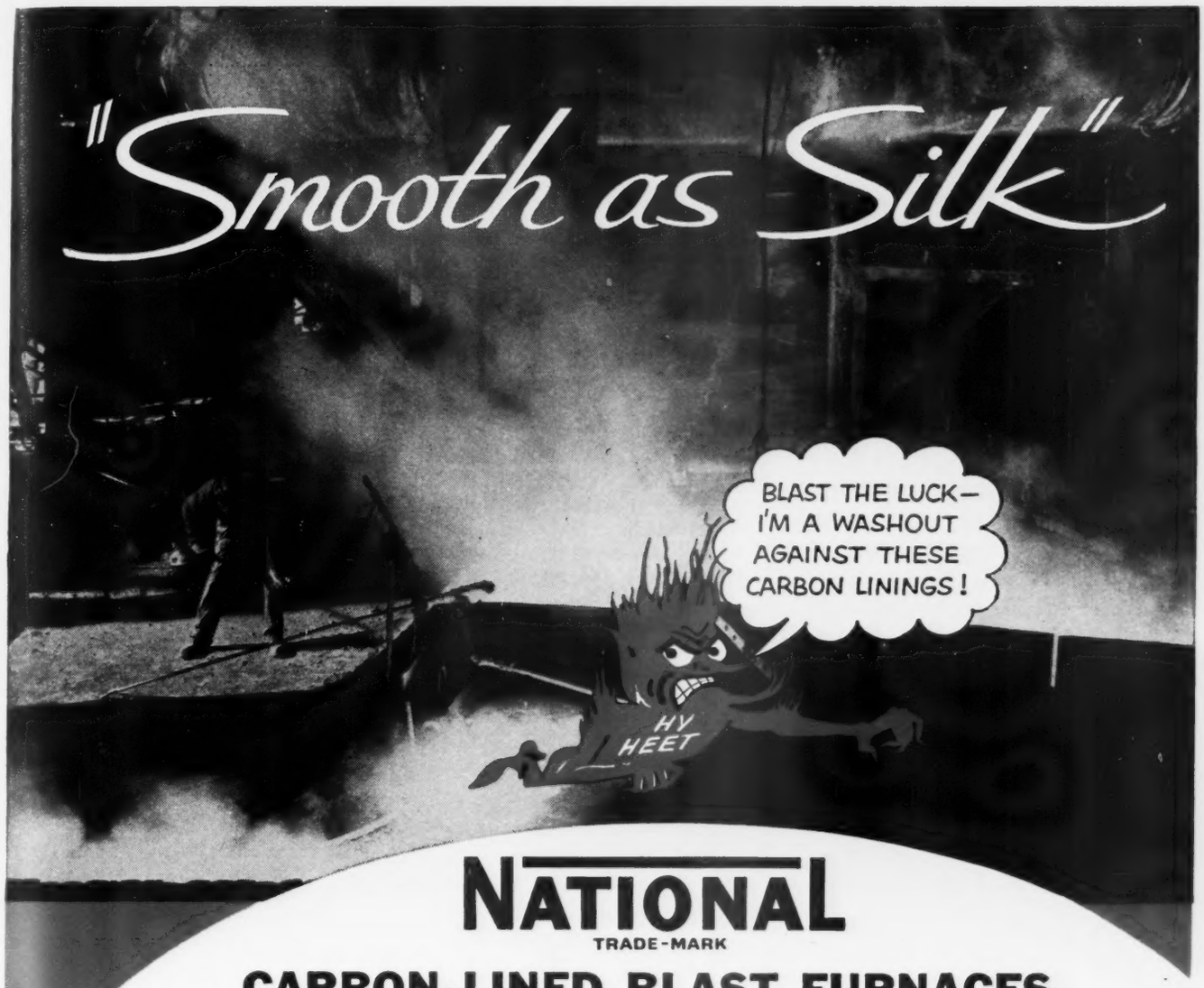
Conversion Loss in the Cupola

QUESTION Would you give us information on the proper method for determining the oxidation percentage from our daily foundry reports? At present we are using the following: Total weight of good and bad castings, gates and risers, and the drop. That figure is subtracted from the total weight charged, and the remainder divided by the total weight charged. Is it correct to use the weight of the drop to arrive at the oxidation percentage? We are using a 72-in. cupola lined to 54 in. Can you give us an approximate percentage of normal oxidation with our setup?

ANSWER By reference to the drop, we assume that you mean the actual metallic content separated from the coke and slag, and if so that should be included in the figures as you indicate. The method you employ will give a rough approximation of what is termed conversion loss rather than actual oxidation loss.

However, for a more exact determination it would be necessary to include further steps to account for all possible metallics. For example, the spills around the pouring area should be collected; the ladle skimmings and skulls examined for metallics, and even the slag should be examined. You did not mention including over-iron—that is, the cold iron left in the ladles after pouring, and which usually is pigged.

Conversion loss, according to Gregg in a paper in the *Transactions* of the American Foundrymen's Society, 1950, may vary from 2 per cent with good, clean raw materials and operating procedure to 10 per cent with dirty, oxidized or light section scrap. *Cupola Operations Handbook* gives normal conversion loss as 5 per cent, and when scrap is in excess of two-thirds of the total charge and much of it is light-section material, the figure of 6 per cent should be used.



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TYPICAL of the many comments favoring carbon-lined furnaces after the recent strike, was that made by the manager of a large eastern mill.

Describing his carbon hearths as coming back on blast "smooth as silk", he joins the many other users reporting faster, easier, more economical return to normal operation with carbon lined furnaces than with any other type of lining.

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MEN of Industry

HENRY J. TRENKAMP, elected president of the Gray Iron Founders' Society for the coming year, is president, Ohio Foundry Co., Cleveland. Mr. Trenkamp joined the company as timekeeper over 35 years ago, following graduation from St. Ignatius College, now John Carroll University. Successively he was connected with the production and sales departments, and was named treasurer in 1943 and president the following year. He is the third generation of the family to head the Ohio Foundry Co., which was organized by his grandfather in 1893. Mr. Trenkamp has served as a director and treasurer of the Gray Iron Founders' Society and chairman of its Nothern Ohio group. He is a past president of the Northeastern Ohio Chapter of the American Foundrymen's Society.

♦ ♦ ♦

William H. Cantwell has been appointed managing director, Eastern Malleable Iron Co., Wilmington, Del., succeeding the late George E. M. Bean. Mr. Cantwell, while attending Pratt Institute of Technology, worked as a summer employee with Eastern Malleable. In 1922 he became an assistant foreman in the Wilmington plant, and worked successively as foundry foreman and assistant superintendent there and then as assistant superintendent of the Cleveland plant. He returned to Wilmington in 1938 as superintendent and in 1943 was named assistant managing director.

♦ ♦ ♦

Ralph L. Wilson, elected president of the American Society for Metals for 1952-53, is director of metallurgy, Steel & Tube Division, Timken Roller Bearing Co., Canton, O. Mr. Wilson was graduated from Lehigh University in 1921 and in 1928 joined Timken Steel & Tube Co., where he became metallurgical engineer. In 1937 he went with Climax Molybdenum Co., New York, and during World War II was in Washington with the War Production Board, where he was section chief of the Steel Division. He returned to the Steel & Tube Division of Timken in 1944 and was named director of metallurgy in 1946. Active in local and national work with the ASM, Mr. Wilson was its vice president last year.

♦ ♦ ♦

James H. Baldrey has been appointed supervisor of melting, the Cooper Alloy Foundry Co., Hillside, N. J. Mr. Baldrey, who attended Rensselaer Polytechnic Institute, has been associated with the Watervliet, N. Y., plant of Allegheny Ludlum Steel Co. for the past 18 years and since 1939 has been manager of melting there. He is currently serving as president of the Electric Metal Makers Guild.

Leon Burnett, formerly associated with Pyott Foundry, Chicago, has been appointed manager of Kenton Foundry Co., division of Bruce Foundry & Mfg. Co., Tecumseh, Mich.

♦ ♦ ♦

Alfred A. Diebold has been named vice president of operations, Atlas Steel Casting Co., Buffalo. Mr. Diebold, who has been with the company 34 years, has been works manager since 1942. He is a former chairman of the Western New York Chapter of the American Foundrymen's Society.

♦ ♦ ♦

Joseph S. Imirie has been appointed to the newly created position of assistant to the president, the Carborundum Co., Niagara Falls, N. Y. A graduate of Catholic University, Mr. Imirie has served the government in a number of important Air Force ad-

(*Continued on page* 120)

HENRY J. TRENKAMP
. . . president, GIFS

WILLIAM H. CANTWELL
. . . E. M. I. Co. manager

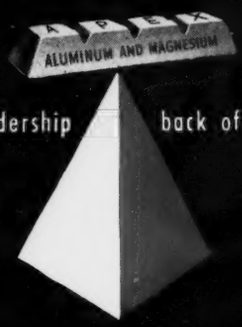
RALPH L. WILSON
. . . ASM president

JAMES H. BALDREY
. . . Cooper Alloy supervisor

APEX

Z-50

aluminum alloy



Research leadership back of every Ingot

APEX SMELTING COMPANY

(*Continued from page* 118)

ministrative functions, most recently as deputy under secretary of the Air Force. Since he joined Carborundum Co. early this year he has been engaged in investigation of new products.

♦ ♦ ♦

John G. Steinebach has joined the foundry department of the Chemical Division, Borden Co., New York, as sales representative in Michigan for the company's foundry products, including core and shell bonding resins, core pastes and sprays. His headquarters will be at 1713 Mansfield Ave., Birmingham, Mich. Mr. Steinebach has been associated with Aluminum Co. of America as a foundry engineer in Cleveland and Detroit since 1949 when he was graduated from Purdue University with a degree in mechanical engineering.

♦ ♦ ♦

Arnold E. W. Johnson, director of engineering, International Harvester Co., Chicago, has been elected vice president in charge of engineering. **Harold B. Myers,** formerly assistant controller, has been named controller, succeeding **Christian E. Jarchow,** who will devote full time to his duties as executive president.

♦ ♦ ♦

Robert L. Halsted has been appointed central regional manager, General Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, with headquarters in Cleveland. He succeeds **P. F. Bauer,** recently named general manager of the company's Norwood, O., works, and manager of the apparatus department. Mr. Halsted joined the company in 1935 and was manager of the Charleston, W. Va., office from 1942 until 1948, when he became Cleveland district office manager. **Joseph Bronaugh** has replaced Mr. Halsted in Cleveland, following 6 years as manager of the Miami, Fla., office. Mr. Bronaugh, who has been with the company since 1929, was manager of the Norfolk, Va., office before managing the Miami branch.

♦ ♦ ♦

William J. Taylor has been appointed president of Exothermic Alloys Sales & Service Inc., Chicago, succeeding **John J. Grady,** who has become executive vice president-general manager of Chromium Mining & Smelting Corp., Chicago, and Montana Ferroalloys Inc., Memphis, Tenn. **William F. Skeer** has been named vice president of the company, **Gordon B. Thomson** secretary-treasurer, and **Jess C. Kerr** a director.

♦ ♦ ♦

R. R. Huntington has been appointed sales engineer in Louisiana, Mississippi and eastern Texas for Joseph Dixon Crucible Co., Jersey City, N. J. Mr. Huntington will assist E. M. Brooks, Dixon representative, in handling the company's line of crucibles, refractories, silica-graphite paints, graphite and graphited lubricants.

♦ ♦ ♦

T. M. Blank has been elected vice president, Carbon Malleable Castings Corp., Lancaster, Pa. He has been plant manager since 1949 and was formerly associated with Columbia Malleable Division, Grinnell Inc., Columbia, Pa.

♦ ♦ ♦

John A. Schumann has been appointed sales engineer, Carpenter Brothers Inc., Milwaukee, supplier of foundry sands, bonding clays and steel abrasives. Mr. Schumann was graduated from Ohio State University and until recently was with Central Foundry Division, General Motors Corp., in Defiance, O., as supervisor of sand controls, sand research development work and cupola metallurgical control.

♦ ♦ ♦

Myron C. Meyer has been named manager of wire braid hose sales, Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O. Mr. Meyer, who joined Republic Rubber Division in 1918, served as territory salesman in Ohio, Michigan and Indiana from 1933 to 1938, when he was reassigned to Youngstown. Until recently he has been assistant to the sales manager there.

♦ ♦ ♦

Norman J. McLeod has been named president-general manager, Safety Clothing & Equipment Co., Cleveland. For the last 10 years Mr. McLeod was vice president, Royal Vacuum Cleaner Co. **Earl Brooks,** former president of Safety Clothing, has become chairman. **L. F. Brooks** continues as vice president and **Lee Debes** as sales manager.

♦ ♦ ♦

William L. Gillespie has been appointed field salesman for Chicago and the midwest area, Hooker Electrochemical Co., Niagara Falls, N. Y. Mr. Gillespie, with the company since 1939, was in the development and research department until 1950, when he was transferred to technical service in the sales department. **Harold Wever,** who has been in development and research since 1943, has been transferred to technical sales service.

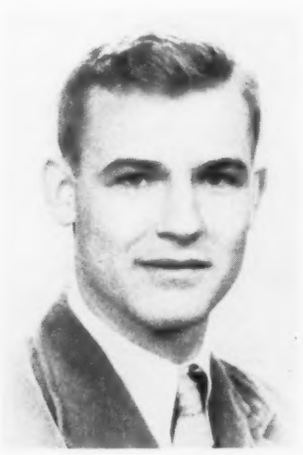
♦ ♦ ♦

Harold C. Olson has been named works metallurgist for the Los Angeles plant of the Lindberg Steel Treating Co., Chicago. Mr. Olson, a graduate of Illinois Institute of Technology, was formerly works

(*Continued on page* 123)

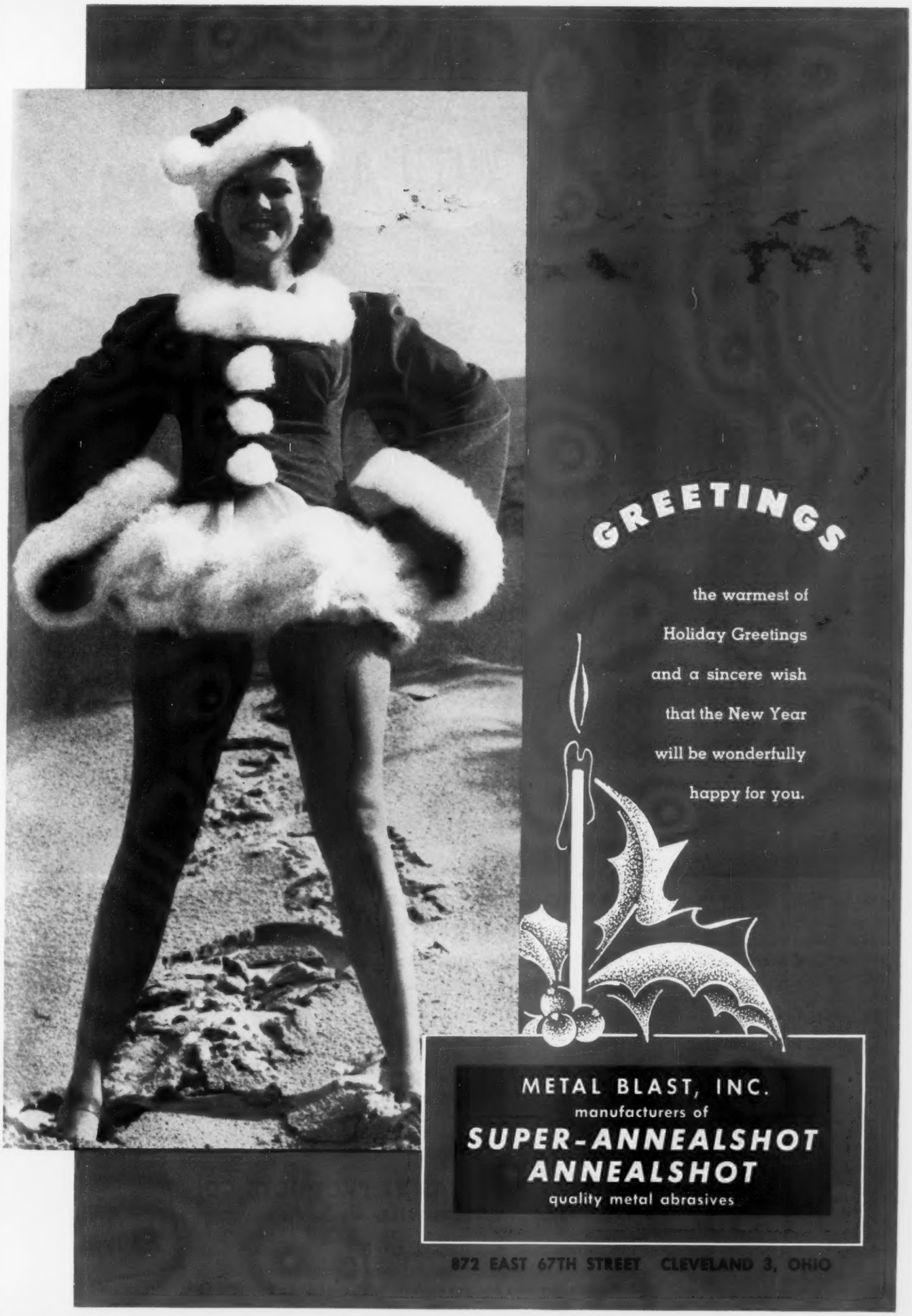
ROBERT L. HALSTED
. . . Allis-Chalmers manager

JOSEPH BRONAUGH
. . . Allis-Chalmers office mgr.



JOHN A. SCHUMANN
. . . Carpenter Brothers sales

HAROLD C. OLSON
. . . joins Lindberg Steel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Holiday Greetings
and a sincere wish
that the New Year
will be wonderfully
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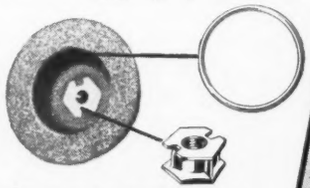
EXTRA SAFETY FACTOR from Bay State's patented process that secures the steel nut to the wheel. Steel ring imbedded for additional safety, as needed.



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ASK for a BAY STATE abrasive engineer to prove a new peak of performance on your job today!

ARTHUR J. TUSCANY JR.
. . . association management

C. DOUGLAS GALLOWAY III
. . . heads Chesapeake Chapter

CLIFFORD O. BOYCE
. . . joins Lester B. Knight

PHILIP H. CLAPP JR.
. . . Brake Shoe V. Pres.

(*Continued from page* 120)

metallurgist at the Melrose Park, Ill., plant of International Harvester Co., Chicago.

♦ ♦ ♦

Arthur J. Tuscany Jr. has joined the Arthur J. Tuscany Organization, association management company headed by his father Arthur J. Tuscany. Organizations which the company represents include the Foundry Equipment Manufacturers' Association. Mr. Tuscany Sr. has been secretary-treasurer of the latter organization for 18 years. Mr. Tuscany Jr. was graduated from Duke University following military service in China where he spent some time instructing Chinese army officers in the use of American electronic equipment following World War II. For the past 5 years he has been engaged in trade association management in the metal trades industries.

♦ ♦ ♦

Beresford N. Clarke has been appointed sales engineer in the New England territory, Surface Combustion Corp., Toledo, O., with headquarters in the Quincy, Mass., office, where he will be engaged in the sale of special furnace heat treat equipment. Mr. Clarke joined the company in 1948 following graduation from Purdue University.

♦ ♦ ♦

Clinton F. Zabriskie has been appointed foundry metallurgist, Sperry Gyroscope Co., Great Neck, N. Y.

♦ ♦ ♦

Richard H. Gannon, for the past 3 years Washington district manager for Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., has been named manager of the Los Angeles office, serving southern California and Arizona. A graduate of Harvard University, Mr. Gannon was previously sales engineer in the Los Angeles office.

C. Douglas Galloway III, elected chairman of the Chesapeake Chapter of the AFS for 1952-53, is foundry superintendent, Chambersburg Engineering Co., Chambersburg, Pa. Mr. Galloway was graduated from Princeton University in 1935 with a degree in mechanical engineering. He was associated with Thomas Devlin Mfg. Co., Burlington, N. J., until 1937, when he joined Chambersburg Engineering Co. He has been foundry superintendent there since 1938 and also is plant metallurgist and a director of the company. Mr. Galloway is a member of the Foundry Educational Foundation Industry Advisory Committee at Penn State University.

♦ ♦ ♦

Clark W. Avery retired recently at the age of 70, following 45 years as a patternmaker for the Joplin Foundry Co., Joplin, Mo. Mr. Avery served his foundry apprenticeship in Springfield, Mo., following his father's trade as a patternmaker. Since he joined the Joplin foundry in 1907 he has been engaged principally in making patterns for mining machinery.

♦ ♦ ♦

Thomas E. Moffitt, for the past year works manager of the Tacoma, Wash., plant, Hooker Electrochemical Co., Niagara Falls, N. Y., has been appointed western manager. **Horace W. Hooker Jr.,** since 1947 general purchasing agent, has been named western sales manager, succeeding **Albert H. Hooker,** whose health has caused an extended leave of absence.

♦ ♦ ♦

James A. Davis was named assistant to Mel F. Burr, president and general manager of Electronicast Inc., Chicago producer of precision castings. He was formerly with the Blue Island branch of Acme Metal Products Corp.

Clifford O. Boyce has been named assistant manager of the construction engineering division, Lester B. Knight & Associates Inc., Chicago. Mr. Boyce has been engaged in engineering and architectural pursuits in Chicago since 1938.

♦ ♦ ♦

Philip H. Clapp Jr. has been appointed vice president, Engineered Castings Division, American Brake Shoe Co., New York. Mr. Clapp was graduated from University of Michigan and joined the Engineered Castings Division in 1946 as an apprentice. He was transferred to the sales department in 1947 and since 1949 has been sales manager.

♦ ♦ ♦

A. M. Cox, president, Pittsburgh Commercial Heat Treating Co., Pittsburgh, was recently elected president of the Metal Treating Institute at its annual meeting in Philadelphia. Mr. Cox is also president of J. P. Devine Mfg. Co., and Pittsburgh Wire Form & Mfg. Co., Pittsburgh.

♦ ♦ ♦

George H. Powers, until recently sales engineer in the refractories division, Norton Co., Worcester, Mass., has been appointed refractories engineer for New York and New Jersey, with headquarters in the New York office. He succeeds **Fred E. Leiby** who has retired following 29 years with the company. **Enfried T. Larson,** formerly sales engineer, has been named editor of technical publications.

♦ ♦ ♦

H. Pagels has been appointed vice president in charge of manufacturing, and **F. C. Messaros** vice president in charge of engineering, American Engineering Co., Philadelphia. Mr. Pagels attended Hamburg State School of Engineering. After serving as chief process engineer, U. S. Rubber Co., in Milwaukee, he became

works manager of American Engineering Co. in 1945. Mr. Messaros attended Temple University and University of Pennsylvania. He joined American Engineering Co. 25 years ago and since 1946 has been chief engineer in charge of research and engineering.

♦ ♦ ♦

E. W. Petersen was recently appointed general sales manager, American Blower Corp., Detroit. Mr. Petersen, who joined the company in 1923, was merchandise manager for the packaged products of the heating and ventilating divisions until last year when he became assistant general sales manager.

♦ ♦ ♦

Robert F. Tighe has been appointed manager of the Cleveland district sales office, Kaiser Aluminum & Chemical Sales Inc., Oakland, Calif., succeeding **Robert H. Black** who has been transferred to the company's general office in Oakland. Mr. Tighe attended Purdue University and during more than 5 years with Kaiser has served as sales engineer in Cleveland and Dayton, O., and most recently as product manager for pig and ingot with headquarters in Chicago.

♦ ♦ ♦

John D. Floyd has been named representative in the North and South Carolina area to handle sale of resins and woodworking adhesives for the Chemical Division, Borden Co., New York.

♦ ♦ ♦

George A. Park has been named manager of distributor sales, Norton Co., Worcester, Mass., a position recently established by the company. Mr. Park was formerly sales manager of Norton's eastern region. **Donald L. Price,** formerly sales manager of the central region, as sales manager of the eastern region will be responsible for sales in the two regions, which have been combined. **Fred L. Curtis** continues as sales manager of the western region.

♦ ♦ ♦

Andrew E. St. John was recently elected president, Alloys & Products Inc., New York, succeeding the late Henry Hecht who founded the company in 1919. Mr. St. John, a graduate of Case Institute of Technology, joined the company last year as vice president-treasurer. He will continue in the latter position. **C. A. Hecht** has been named vice president of the company and **Wilson Hecht** a director.

♦ ♦ ♦

William K. Gibb was recently appointed chief inspector, Atlas Foundry & Machine Co., Tacoma, Wash. Mr. Gibb was formerly inspector of castings at Boston Electro Steel Co., Boston, and metallurgist at the Puget Sound Navy Yard.

♦ ♦ ♦

Howard S. Avery, research metallurgist, American Brake Shoe Co., Mahwah, N. J., has been awarded the 1952 Lincoln Gold Medal of the American Welding Society. Mr. Avery received the award for a paper published this year, "Hard Facing for Impact." **O. B. J. Fraser,** assistant manager of the Development and Research Division, International Nickel Co., New York, received the Samuel Wylie Miller Memorial Medal of the society in recognition of his studies of field applications and promotion of welding research.

♦ ♦ ♦

James S. Vanick, metallurgist, International Nickel Co., New York, was recently elected chairman of the Metropolitan Chapter of the AFS. Mr. Vanick was graduated from Case Institute of Technology and received a master's degree in science from George Washington University. In 1916 he became engineer of tests in New York and Chicago for the British Ministry of Munitions and held the same position with the U. S. Army, Washington, from 1917-19, when he was appointed research metallurgist for the Bureau of Standards. He joined International Nickel Co. in 1922 and is now a metallurgist with its Development and Research Division.

♦ ♦ ♦

Wayne H. Hunter has been appointed assistant sales development manager, Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, O. Mr. Hunter joined the company in 1949, following graduation from Ohio State University, and has worked in engineering and sales in St. Louis and Youngstown.

♦ ♦ ♦

Robert Eidam recently joined American Steel Foundries, Hammond, Ind., as metallurgist, following graduation from Purdue University.

♦ ♦ ♦

Ralph J. Furstoss has been appointed assistant director of research, Caterpillar Tractor Co., Peoria, Ill., succeeding **Russell C. Williams,** who has resigned following 20 years with the company. Mr. Furstoss was graduated from University of Notre Dame and joined Caterpillar in 1934. He became a field engineer in 1936 and most recently was supervisor of field engineering.

♦ ♦ ♦

W. G. Munro has been appointed sales representative in southern Ohio and Kentucky for National Engineering Co., Chicago. Mr. Munro has been associated with the company in sales and service capacities since 1939. Recently he was service and erection engineer in the midwest area for the company's line of mix-mullers.

GEORGE A. PARK
. . . Norton distributor sales

JAMES S. VANICK
. . . AFS Chapter Chairman

RALPH J. FURSTOSS
. . . Caterpillar research

W. G. MUNRO
. . . engineering sales

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- **MEXADIP WILL NOT FERMENT.** You will not have to dump your wash because of hot humid conditions — no pock marks or pitted coating surfaces with MEXADIP.

- **MEXADIP STAYS IN SUSPENSION.** Let it stand over the week end, it will be ready to go Monday morning.

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IMPROVE CASTING APPEARANCE AND SAVE MAN HOURS IN THE CLEANING ROOM. If you have a problem with core wash, MEXADIP will solve it. Ask us to arrange a test today.

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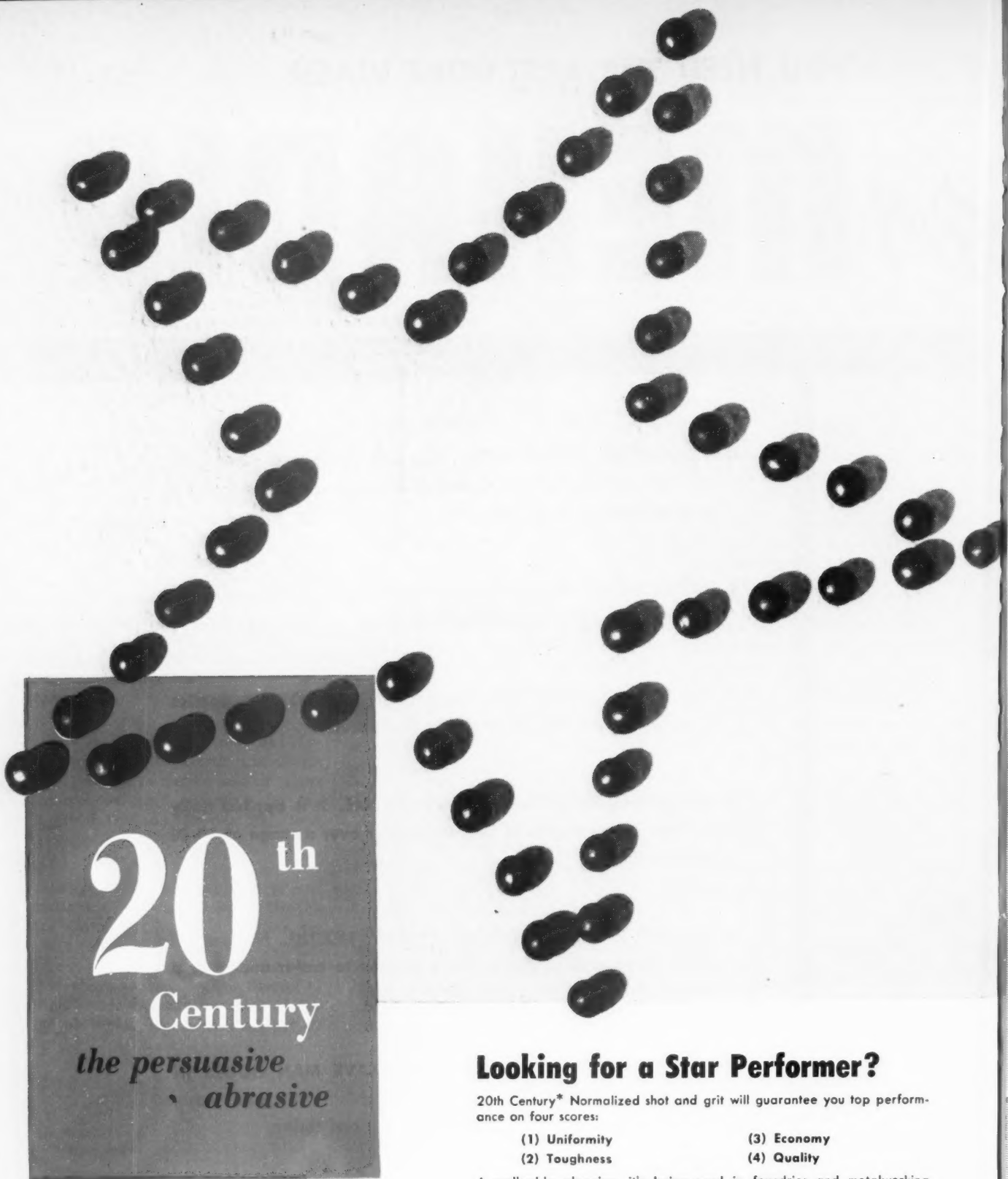

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Foundry STATISTICS

Malleable Iron

(Shipments of castings—net tons[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1950	920,502	512,192	.....
1951			
Aug.	90,727	57,164	249,273
8 mo.	744,826	450,032	.....
Sept.	82,276	48,568	244,575
Oct.	93,884	58,251	238,019
Nov.	88,210	53,682	220,740
Dec.	76,045	45,543	215,134
Total	1,085,241	656,076	.....
1952			
Jan.	87,003	54,988	202,799
Feb.	82,898	50,129	193,061
Mar.	80,960	49,084	196,896
Apr.	89,270	56,337	198,215
May	81,770	51,476	180,382
June	74,446	46,511	173,353
July	45,266	29,675	166,517
Aug.	63,716	39,308	162,832
8 mo.	605,329	377,508	.....

Copper-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Unfilled Orders[2]
1950	1,056,973	953,590	55,614	.....
1951				
Aug.	95,024	84,503	5,422	84,821
8 mo.	816,258	733,135	47,212	.....
Sept.	89,567	79,676	5,493	84,611
Oct.	99,355	88,332	6,237	82,491
Nov.	92,102	82,270	6,043	82,667
Dec.	80,259	72,813	4,958	80,294
Total	1,177,541	1,056,226	69,943	.....
1952				
Jan.	89,616	80,376	6,233	78,316
Feb.	86,231	77,813	5,204	75,279
Mar.	88,642	79,437	6,182	72,463
Apr.	84,460	75,590	5,914	70,602
May	81,903	73,723	5,420	70,252
June	75,359	67,748	4,858	70,797
July	64,762	58,931	3,637	74,739
Aug.	77,094	70,030	4,830	73,925
8 mo.	648,067	583,548	42,278	.....

Aluminum

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—Sand	Shipments—Perm. Mold	Shipments—Die	Unfilled Orders[2]
1950	543,082	184,782	181,366	167,201	.....
1951					
Aug.	45,207	17,813	14,452	11,767	117,838
8 mo.	380,582	140,007	124,454	108,919	.....
Sept.	41,864	16,490	11,793	12,293	112,973
Oct.	45,419	17,694	13,495	13,049	110,382
Nov.	41,661	16,278	11,725	12,604	116,044
Dec.	40,907	16,202	11,262	10,891	110,249
Total	550,433	206,671	172,729	157,756	.....
1952					
Jan.	46,424	18,051	12,236	13,884	109,654
Feb.	44,847	17,451	13,445	13,012	110,327
Mar.	46,448	19,017	13,673	12,880	104,749
Apr.	49,824	19,451	14,631	14,482	104,004
May	47,752	18,317	14,292	13,907	100,802
June	45,310	18,452	11,982	13,860	103,685
July	40,091	16,342	10,866	12,341	106,673
Aug.	46,761	18,477	12,397	12,884	112,852
8 mo.	367,430	145,558	103,522	107,250	.....

Magnesium

(Shipments of castings—1000 pounds[1])

	Shipments—Total	Shipments—For Sale	Unfilled Orders[2]
1950	15,224	13,310	.....
1951			
Aug.	2,957	2,543	16,095
8 mo.	20,745	18,057	.....
Sept.	2,551	2,306	16,407
Oct.	2,977	245	16,143
Nov.	3,946	2,954	15,550
Dec.	2,916	2,525	14,729
Total	33,135	28,596	.....
1952			
Jan.	3,569	3,083	14,047
Feb.	3,368	2,940	14,459
Mar.	3,319	2,972	13,279
Apr.	3,051	2,751	13,244
May	3,002	2,698	13,041
June	2,948	2,699	12,094
July	2,654	2,393	12,948
Aug.	2,722	2,486	13,178
8 mo.	24,633	22,022	.....

Foundry Production Workers

	Estimated Number Aug. 1952	July 1952	Aug. 1951
Ferrous	.....	220,100	280,900
Nonferrous	.....	92,400	109,000
Average Weekly Earnings			
Gray Iron	$68.58	$64.33	$68.31
Malleable Iron	60.13	64.81	71.43
Steel	73.95	74.86	76.25
Nonferrous	75.81	73.90	73.29
Average Weekly Hours			
Gray Iron	39.8	38.5	41.2
Malleable Iron	34.3	36.7	41.7
Steel	40.7	41.2	43.3
Nonferrous	40.8	40.1	41.5

Labor Turnover Rate (July)

(Per 100 employees)

	Total Accession	Total Separation	Quit	Layoff
Gray Iron	2.6	4.5	2.3	1.5
Malleable Iron	1.8	4.8	2.1	2.0
Steel	4.2	5.0	2.7	1.6
Nonferrous	4.5	6.3	2.1	3.4

Source: Bureau of Labor Statistics

Gray Iron Castings—Shipments

(Net tons[1])

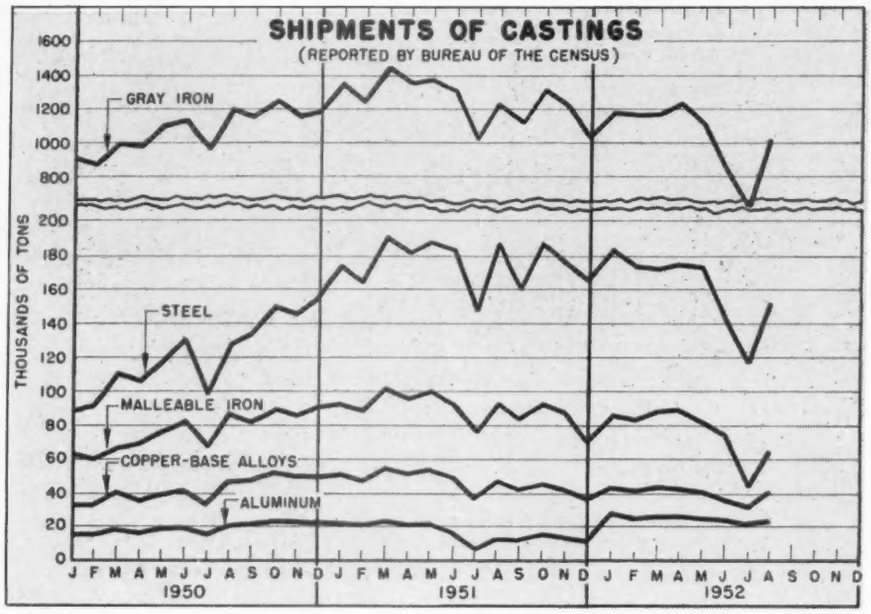
	All Castings—Total	All Castings—For Sale	Miscellaneous Castings—Total	Miscellaneous Castings—For Sale	Heavy Steel Ingot Molds—Total	Heavy Steel Ingot Molds—For Sale	Chilled Railroad Car Wheels—Total	Chilled Railroad Car Wheels—For Sale	Pressure Pipe & Fittings Total[3]	Soil Pipe & Fittings Total[3]	Unfilled Orders[2] Total
1950	12,905,562	6,880,352	8,117,748	3,415,281	2,308,661	1,043,590	514,074	456,402	1,203,762	761,317	.....
1951											
Aug.	1,218,832	697,952	779,838	378,042	222,721	109,257	50,127	44,507	115,284	50,862	2,144,587
8 mo.	10,355,453	5,838,020	6,668,022	3,121,932	1,737,511	843,367	451,004	394,189	992,130	506,238	.....
Sept.	1,114,789	625,511	704,657	328,331	204,856	96,011	45,467	41,360	111,893	47,916	2,055,392
Oct.	1,301,681	732,764	815,815	382,405	244,556	115,738	53,172	46,483	130,636	57,502	1,983,307
Nov.	1,183,833	674,139	737,971	348,991	222,665	107,569	48,759	43,141	129,766	44,672	1,933,972
Dec.	1,032,799	582,614	646,352	309,696	204,911	94,857	41,594	38,119	108,767	31,175	1,847,065
Total	14,988,555	8,453,048	9,573,347	4,471,539	2,614,517	1,257,542	639,996	563,272	1,473,192	687,503	.....
1952											
Jan.	1,199,285	694,498	745,548	359,806	225,704	110,263	57,155	53,551	125,729	45,149	1,800,905
Feb.	1,155,143	654,833	733,067	348,885	219,251	105,918	50,444	47,649	107,669	44,712	1,766,434
Mar.	1,172,017	660,920	723,225	334,492	228,799	110,607	53,919	49,747	115,843	50,231	1,711,037
Apr.	1,204,801	652,962	773,538	347,121	204,805	85,239	48,506	42,650	117,929	60,023	1,614,428
May	1,100,630	620,049	698,332	317,150	186,998	91,980	44,229	39,848	117,586	53,485	1,459,305
June	835,263	502,322	616,895	292,846	19,467	10,575	44,066	44,066	103,335	51,500	1,445,521
July	636,141	431,889	427,475	227,794	14,794	10,223	40,783	40,783	96,784	56,305	1,409,684
Aug.	1,002,732	602,986	596,511	295,861	198,856	99,760	35,606	35,606	108,713	63,446	1,517,566
8 mo.	8,306,012	4,820,459	5,314,591	2,523,595	2,298,674	624,565	374,708	353,900	893,588	424,851	.....

Steel Castings—Shipments

(Net tons[1])

	All Castings—Total	All Castings—For Sale	All Castings—Railway Specialties	Carbon Steel—Total	Carbon Steel—For Sale	Carbon Steel—Railway Specialties	Alloy Steel—Total	Alloy Steel—For Sale	Alloy Steel—Railway Specialties	Unfilled Orders[2] Total
1950	1,459,382	1,042,884	261,357	1,081,162	788,619	243,215	379,220	254,265	18,142	.....
1951										
Aug.	177,096	128,981	41,763	130,913	99,732	36,086	46,183	29,249	5,677	944,211
8 mo.	1,357,592	995,568	322,441	1,035,932	783,989	285,901	321,660	211,579	36,440	.....
Sept.	160,695	116,658	35,500	120,632	89,711	33,086	40,063	26,887	2,414	918,038
Oct.	189,929	139,953	39,984	138,610	104,449	36,488	51,319	35,504	3,496	891,508
Nov.	176,728	131,276	35,034	126,544	95,180	31,099	50,184	36,096	3,935	865,029
Dec.	165,110	123,448	33,213	119,762	89,298	29,341	45,348	34,150	3,872	846,436
Total	2,050,054	1,506,903	466,172	1,541,280	1,162,687	415,915	508,574	344,216	50,157	.....
1952										
Jan.	183,738	139,488	37,091	133,985	102,265	31,806	49,753	37,223	5,285	869,299
Feb.	174,626	133,602	31,719	125,484	94,969	28,251	49,142	38,633	3,468	856,872
Mar.	173,694	131,997	32,118	125,787	95,206	27,782	47,907	37,196	4,336	857,115
Apr.	175,075	134,325	33,549	126,628	97,128	29,798	48,447	37,654	3,751	842,970
May	173,635	132,129	35,227	125,309	95,816	30,995	48,326	37,129	4,223	804,695
June	141,628	114,410	30,455	101,850	84,388	26,815	39,778	30,818	3,640	846,459
July	119,036	97,633	20,752	81,576	67,600	18,694	37,460	30,329	2,058	855,046
Aug.	150,232	113,997	24,498	107,203	80,877	21,626	43,029	33,120	2,872	809,354
8 mo.	1,291,664	997,581	245,489	927,822	718,249	215,767	363,842	282,586	29,633	.....

[1] Source: Bureau of Census. [2] All cast iron pipe is shipped for sale. [3] For sale only.



Index of Foundry Equipment Orders

Foundry Trades Only

(Net Orders Closed, New Equipment)

	1951	1952
Jan.	668.0	404.5
Feb.	638.6	200.4
Mar.	599.0	310.0
Apr.	490.1	385.1
May	431.7	225.2
June	393.2	353.8
July	390.3	343.9
Aug.	404.5	311.6
Sept.	346.5	365.9
Oct.	372.4	....
Nov.	305.5	....
Dec.	230.5	....

Note: Figures are percentages of the base period 1937-1939 taken as 100 per cent (monthly average). Source: Foundry Equipment Manufacturers Association.

Coke Production and Consumption

(Net tons*)

	Production	Consumption Total	Consumption By Foundries
1950	72,718,038	73,373,618	3,523,396
1951			
Sept.	6,494,900	6,366,969	274,017
9 mo.	59,287,500	58,767,188	2,849,840
Oct.	6,742,767	6,727,211	292,737
Nov.	6,501,098	6,562,279	272,333
Dec.	6,738,759	6,821,446	249,490
Total	79,133,744	78,868,124	3,664,404
1952			
Jan.	6,804,106	6,760,011	261,148
Feb.	6,358,715	6,411,905	251,125
Mar.	6,779,639	6,743,944	264,488
Apr.	5,806,153	5,770,711	261,972
May	5,961,757	5,882,922	253,605
June	2,472,940	1,772,203	219,909
July	2,376,019	1,621,308	166,377
Aug.	6,039,749	6,204,539	232,249
Sept.	6,180,568	6,524,079	269,029
9 mo.	48,789,625	47,691,622	1,947,753

Ingot Brass and Bronze

(Shipments in net tons)

	1951	1952
Jan.	28,416	28,315
Feb.	27,168	24,211
March	31,997	23,890
Apr.	30,472	22,547
May	33,267	21,740
June	33,817	21,274
July	32,016	18,947
Aug.	25,285	21,807
Sept.	22,285	22,770
Oct.	23,124	.....
Total for year	332,378	.....

Zinc-Base Alloy

(Shipments of castings—1000 pounds[1])

	Shipments Total	Shipments For Sale	Unfilled Orders[2]
1950	579,332	376,681	.....
1951			
Aug.	41,045	25,946	80,588
8 mo.	292,961	190,958	.....
Total	494,950	328,183	.....
1952			
Mar.	35,083	23,443	67,846
Apr.	37,312	23,741	63,753
May	35,775	22,410	62,397
June	33,829	21,433	60,719
July	23,462	16,055	57,666
Aug.	29,955	18,794	57,333
8 mo.	301,579	195,289	.....

Pig Iron Production and Consumption

	Production** (Standard grades—1000 net tons) Total	Foundry	Malleable	Basic	Low Phos. Intermediate Low Phos. & Bessemer	Consumption* (By type of furnace, 1000 gross tons) Total	Cupola	Air	Electric
1950	64,589.1	2,870.4	3,034.2	50,450.5	8,234.0	58,416	5,475	319	326
1951									
Sept.	5,811.6	257.7	243.7	4,576.8	733.4	5,266	431	27	12
9 mo.	52,429.4	2,392.8	2,280.9	41,172.1	6,583.6	47,580	4,393	266	102
Oct.	6,112.6	260.6	299.4	4,777.4	775.2	5,601	489	31	14
Nov.	5,824.5	285.5	269.0	4,532.1	737.9	5,287	448	29	9
Dec.	5,898.1	247.4	257.5	4,653.0	740.2	5,282	401	28	11
Total	70,264.5	3,186.2	3,169.0	55,134.1	8,774.8	63,760	5,731	354	136
1952									
Jan.	5,964.3	233.1	285.8	4,672.3	773.1	5,452	466	29	14
Feb.	5,701.8	245.2	261.4	4,496.9	698.3	5,139	441	29	11
Mar.	6,226.2	250.3	273.1	4,895.9	806.9	5,552	433	27	7
Apr.	5,170.0	243.8	218.5	4,069.9	638.0	4,714	446	28	8
May	5,414.2	245.4	236.0	4,295.6	637.2	4,823	412	25	8
June	1,043.2	133.7	103.1	758.6	47.7	991	342	20	5
July	981.6	119.7	118.3	712.9	30.7	....	....	....	....
Aug.	5,767.3	262.9	280.6	4,553.8	669.9	....	....	....	....
Sept.	6,069.3	294.7	306.6	4,757.0	710.9	....	....	....	....
9 mo.	42,337.9	2,209.0	2,083.4	33,213.0	5,012.7	....	....	....	....

Iron and Steel Scrap Consumption

(Gross tons*)

	All Scrap Total	All Scrap Purchased	By Types of Furnace: Cupola Total	Cupola Purchased	Air Total	Air Purchased	Electric Total	Electric Purchased
1950	61,497,000	29,403,000	9,474,000	4,666,000	1,118,000	407,000	6,385,000	3,828,000
1951								
June	5,693,402	2,847,856	972,949	517,604	108,740	39,454	693,636	462,092
6 mo.	35,278,491	17,751,310	6,079,684	3,216,632	643,862	235,250	4,173,113	2,702,309
July	5,298,644	2,581,856	747,864	393,254	80,903	29,858	632,782	421,689
Aug.	5,614,535	2,721,287	918,180	487,085	104,809	37,592	720,020	475,190
Sept.	5,377,491	2,585,665	811,332	427,035	93,166	33,640	688,941	460,446
Oct.	5,869,590	2,826,221	951,406	504,804	102,950	38,534	750,915	489,217
Nov.	5,596,368	2,699,556	847,991	451,591	90,302	33,795	738,589	489,999
Dec.	5,483,089	2,656,536	738,150	398,538	87,748	32,430	687,559	450,155
Total	68,518,208	33,822,431	11,090,607	5,878,939	1,203,740	441,099	8,391,919	5,389,005
1952								
Jan.	5,847,011	2,788,426	846,891	449,935	101,211	38,150	743,233	470,126
Feb.	5,572,506	2,702,092	789,293	419,279	94,900	35,536	697,319	440,325
Mar.	5,902,529	2,860,364	791,165	415,853	92,751	35,013	741,793	475,161
Apr.	5,360,417	2,657,926	834,066	440,035	106,059	38,888	684,318	427,339
May	5,369,258	2,660,471	779,436	404,899	94,597	35,966	700,617	455,460
June	2,048,951	1,169,102	719,739	374,127	82,357	30,412	285,596	173,740
6 mo.	30,100,672	14,838,381	4,760,590	2,477,128	571,875	213,965	3,852,876	2,442,151

* Source: U. S. Dept. of Interior, Bureau of Mines. ** Source: American Iron & Steel Institute. [1] Source: Bureau of the Census. [2] For sale only.

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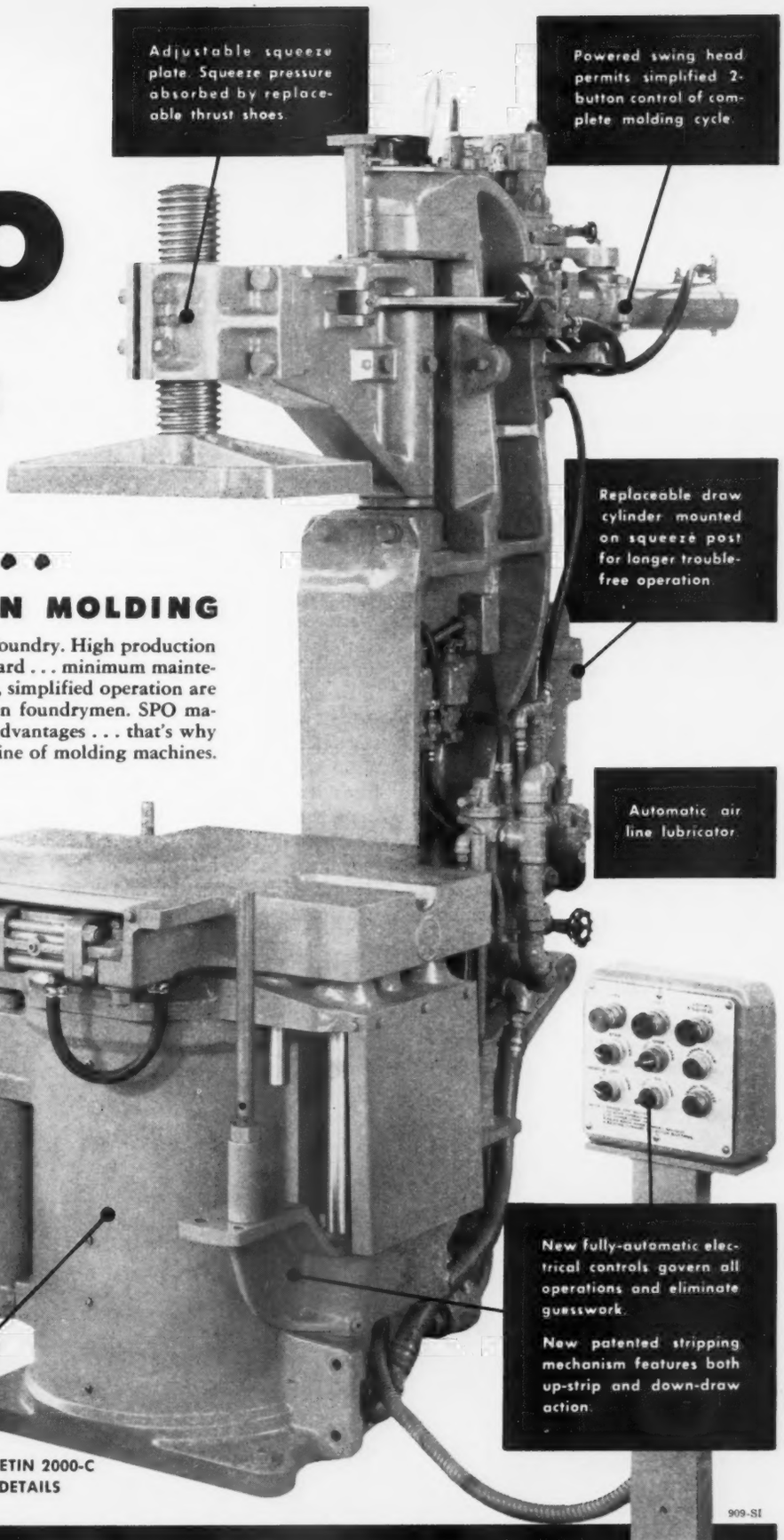

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GRAY IRON FOUNDERS' SOCIETY MEETING

Provides Review of Industry Progress

By WILLIAM G. GUDE
Managing Editor
FOUNDRY

ANOTHER year of considerable progress in its various activities was disclosed by the Gray Iron Founders' Society at its 24th annual meeting, held at Hotel Cleveland, Cleveland, Oct. 16-17. Subjects featured for discussion during the two days included quality control, labor relations, casting design, and regulations of Washington defense agencies. One full session was devoted to reports of society committees.

Henry J. Trenkamp, president, Ohio Foundry Co., Cleveland, was elected president of the society for the coming year, succeeding Edward L. Roth, Motor Castings Co., Milwaukee. Other officers chosen are: Vice president, T. I. Curtin Jr., Waltham Foundry Co., Waltham, Mass.; secretary, C. H. Ker, Dalton Foundries Inc., Warsaw, Ind.; treasurer, Walter O. Larson, W. O. Larson Foundry Co., Grafton, O.

Six newly elected directors to the society's 15-man board are: John A. Cochran, Crawfordsville Foundry Co., Crawfordsville, Ind.; H. L. Edinger, Barnett Foundry & Machine Co, Irvington, N. J. (re-elected); E. M. Knapp, Ferro Machine & Foundry Inc., Cleveland; E. G. Huffschmidt, Western Foundry Co., Portland, Oreg.; R. T. Lewis, Keen Foundry Co., Griffith, Ind.; R. G. Schaefer, Schaefer-Goodnow Foundries Inc., Pittsburgh, (re-elected). D. H. Workman and C. O. Burgess were reappointed executive vice president and technical director, respectively.

Five men were honored by the society at the program's concluding luncheon in the presentation of annual awards. The society's highest award, its gold medal, went to C. R. Culling, president, Carondelet Foundry Co., St. Louis, "for his outstanding and unselfish contributions to the welfare and progress of the industry through his meritorious service on various government advisory committees and on special missions on behalf of the industry; for his sincere leadership and devotion to the affairs of the society, serving as its president and for many years as a member of the board of directors and executive committee, and for his loyal service as a member of the Cost, Handbook, Statistical and Technical Committees, which has contributed greatly to the development of improved merchandising and operating techniques in the industry."

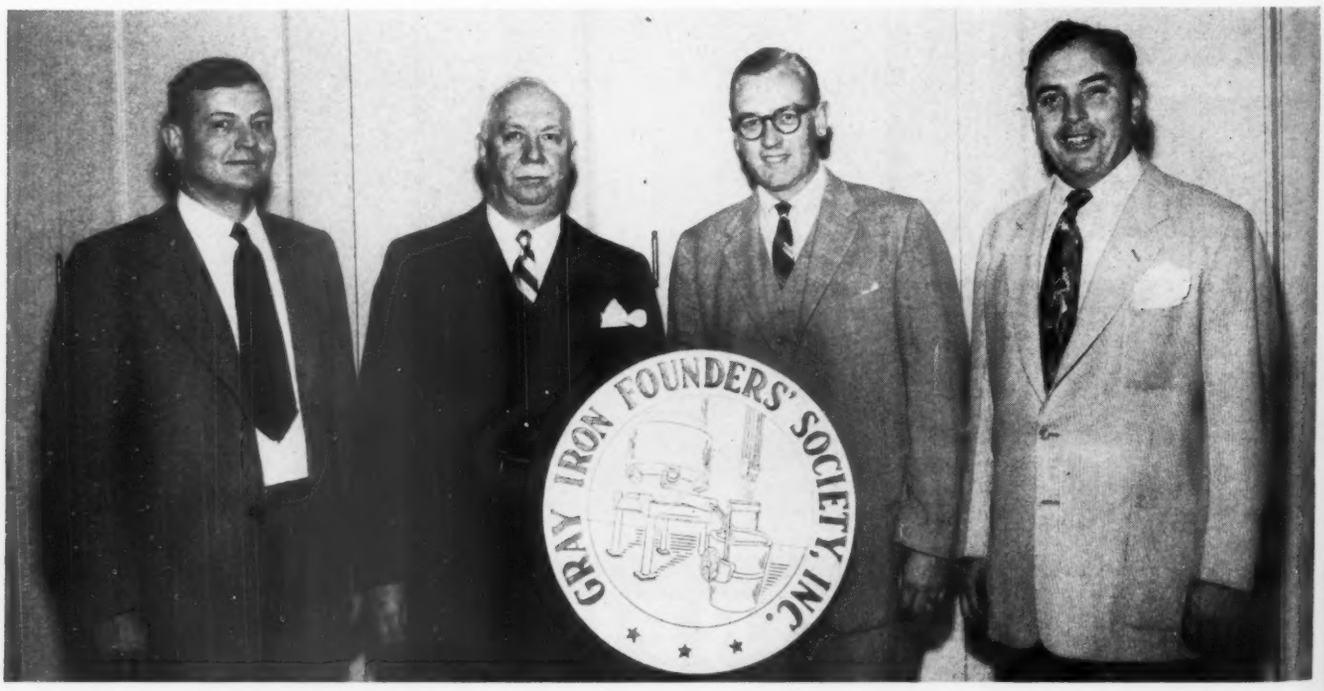
Four citations were awarded. Recipients were:

John A. Claussen, chief, Pig Iron Section, Iron and Steel Division, National Production Authority, Washington, "for his meritorious service with the War Production Board and NPA, for his diligent and faithful devotion to the task of assuring the fair distribution of one of the industry's vitally important raw materials during times of national emergency."

A. J. McDonald, chief, Ferrous Castings Section, NPA, "for his outstanding and unselfish service on behalf of the foundry industry and his country in the administration of his duties as chief of the Ferrous Castings Section during the current emergency, and for his profound interest in the problems of the foundry industry."

Edward B. Smith, retired vice president of the American Brake Shoe Co., New York, "for his outstanding contributions to the welfare of the society and the gray iron foundry industry, for his services as secretary, as a member of the executive committee and the board of directors, and for his meritorious service on behalf of the industry on various government advisory

(*Continued on page* 132)



Officers elected at the recent annual meeting who will head the GIFS in 1952-53. Left to right: C. H. Ker, secretary; H. J. Trenkamp, president; T. I. Curtin Jr., vice president; W. O. Larson, treasurer

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C. R. Culling (left) receives the Gray Iron Founders' Society Gold Medal from President E. L. Roth in recognition of his contributions to industry progress

(*Continued from page* 130)

committees."

James S. Vanick, research metallurgist, the International Nickel Co. Inc., New York, "for his outstanding contributions to metallurgical knowledge, improved production, and wider use of gray iron products, for his unstinting aid to foundrymen everywhere in the solution of industry problems, and for his valuable services in guiding the activities of the society's Handbook and Technical Committees."

One session was devoted to a panel discussion on quality control, and included presentation of two papers on the subject. It was presided over by H. W. Stuart, U. S. Pipe & Foundry Co., Burlington, N. J., chairman of the Quality Control Committee. Mr. Stuart reported that preparation of a quality control guide by his committee is being considered for the coming year.

An interesting discussion of how quality control may be applied to the small foundry was given by W. J. Sommer, Plainville Casting Co., Plainville, Conn. The complete text of Mr. Sommer's paper is presented elsewhere in this issue.

Speaking of various tools used to control quality in a mechanized foundry, Tom W. Curry, Lynchburg Foundry Co, Lynchburg, Va., said that the success or failure of a foundry quality control program is greatly influenced by the correct designation for the cause of casting defects. At Lynchburg a committee which analyzes the plant's scrap castings each day consists of the foundry supervisor and superintendents of the coreroom, melting department, pilot foundry, cleaning room and pattern shop, the plant metallurgist and plant inspector. Records of this group's findings as to the causes of defective castings indicate the place to begin to improve control.

Trouble shooting in the customer's plant also can point the way to improved quality, Mr. Curry stated. On the basis of findings in the field the company has improved its dimensional as-cast tolerances, effected changes in design to eliminate internal porosity and simplify the casting's manufacture, and simplified the customer's finishing operations by eliminating special machining setups for assembly operations. "The work of our chief inspector in the field has become one of our best customer - relations activities," the speaker stated.

Good labor relations can't be legislated, declared Dr. George W. Taylor, University of Pennsylvania, at the concluding business session. Speaking on "Labor Relations is Management's Responsibility," he pointed out that management must take the initiative in settling disputes not rely on government to do it. Labor relations problems have not been changed by the widespread adoption of collective bargaining; the latter is merely a different method of settling the problems.

Since labor relations can have an

(*Continued on page* 134)

Recipients of the Gray Iron Founders' Society citations for outstanding contributions to the advancement of the society and gray iron industry. Left to right: E. B. Smith, J. S. Vanick, A. J. McDonald, J. A. Claussen and E. L. Roth, society president, who made the presentations

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The Colossus of Rhodes, sixth wonder of the world, stood at the entrance of the harbor of Rhodes. It was made of brass, cast in enormous molds.

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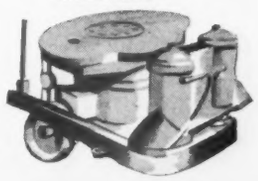

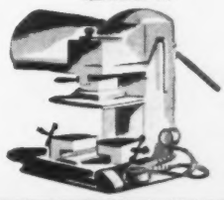

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Officers and directors of the Gray Iron Founders' Society for the coming year. Left to right, seated, are: E. M. Knapp, H. L. Edinger, H. J. Trenkamp, T. I. Curtin Jr., W. A. Morley. Standing: R. G. Schaefer, E. L. Roth, W. O. Larson, C. H. Ker, R. T. Lewis, D. H. Workman and J. A. Cochran. Directors missing from the picture are E. P. Trout, Max Kuniansky, E. G. Huffschmidt, J. E. Quest

(*Continued from page* 132)

important influence on costs and the competitive position of a company, this cost factor offers a real incentive for management to take the initiative in developing good relations. The important thing to recognize, according to Dr. Taylor, is that labor problems are not solved automatically by government regulations and individual signed agreements; they require the day-to-day constant attention of an alert management.

Discussing "Engineering in Your Sales Program," W. T. Bean Jr. Detroit research consultant, defined engineering as the practical application of scientific truths to the production of material things for the betterment of mankind. In this connection he urged foundrymen to learn how to meet the structural and functional needs of their customers. Since good structural design is compatible with good foundry practice, foundrymen are in the best position to effect proper design of cast products.

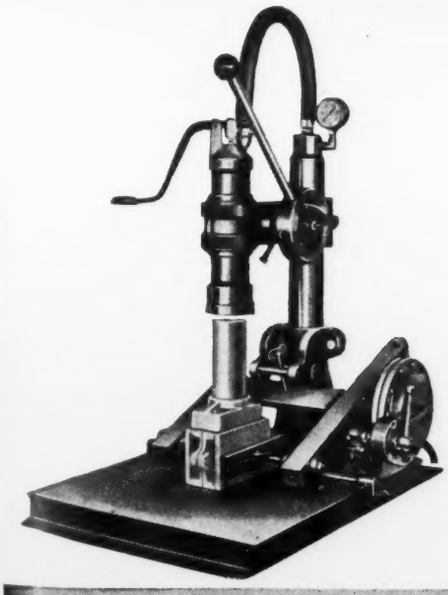
Concluding speakers were A. J. McDonald, chief, Ferrous Castings Section, NPA, and John M. Price, Chief, Castings and Forging Section, OPS, Washington. Mr. McDonald discussed various developments in the defense program of interest to foundries. He said nickel supply is about in balance with consumption, but none is available for new applications. Molybdenum supply is improving steadily. Shortage in steel for construction purposes will last into 1953, but there is enough to complete projects under way. Pig iron capacity, less than 72½ million tons in 1951, will increase to slightly under 83 million tons by 1954. Pig iron consumers who have good reason to increase their inventories above the legal maximum may obtain permission from the NPA Pig Iron Section by application, indicating who offered the buyer the iron and how much stocks would be raised.

Mr. Price confined his remarks principally to the industry earnings survey OPS is making of the gray iron industry to determine if higher ceilings for its products are warranted. A study of 233 foundries' profit status will provide the basis for the agency's decision. Mr. Price urged that foundries receiving the questionnaire complete

(*Please turn to page* 164)

View of luncheon meeting concluding the 24th annual meeting of the Gray Iron Founders' Society

REDFORD *No. 2 Stationary Magazine Type* CORE BLOWER



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AROUND THE COUNTRY

News Reports from . . .

EXCEPT for alloying elements, notably nickel, supply of raw materials for the foundry doesn't seem to be much of a problem currently. At least, that's the way it appears in this area. Pig iron isn't plentiful by any means, but there is enough to go around and keep melting schedules out of danger.

Soft demand for castings, particularly gray iron and malleable, and fact that some farm implement foundries are seriously affected by labor disputes, seems to be the key to the situation. A pickup in demand of any proportion could tighten up the iron picture in a hurry.

With steel mills here operating at 112 per cent of capacity, steelmaking puts a heavy drain on blast furnace hot metal and it isn't likely much additional iron can be made available for foundry use any time soon. Increase in use of scrap in the melt probably would have to be the way out. There is an overabundance of good cast scrap now and prices are below OPS ceiling. It is a good bet therefore, that barring war or a sudden expansion of the defense program, the foundry industry has no serious metallics worries ahead.

Rebuilding of heat treating ovens in the magnesium foundry of Ford Aircraft Engine Division here, was completed recently, and the units are performing according to expectations. Features of the revamped ovens are air-tight doors, completely redesigned and rehabilitated interiors and batch versus monorail conveyor charging.

Modernization of the ovens was undertaken as a hygiene measure, namely, to eliminate from the plant the obnoxious sulphur dioxide odor which emanated from the heat treating operation. Abandonment of the monorail conveyor system formerly used in favor of batch loading was a requisite to make the ovens air-tight. The new oven doors, which weigh 1800 pounds each and are of the vertical lift type, were fabricated in the foundry's maintenance department. Castings are now placed on steel racks and placed in and removed from the ovens by lift truck.

FOUNDRY backlogs are easing. Steel casting shops are operating at capacity, but bookings are off to around 14 to 16 weeks, compared with 18 to 20 weeks earlier in the fall. Aluminum and magnesium shops also are busy, because of defense work and particularly because of aircraft requirements. But here also backlogs are somewhat less extended.

Gray iron jobbing shops have less than three weeks' orders on hand and some slowing up in this division is noted at the captive shops. Malleable shops have about four to six weeks' work on hand and are operating at around 80 per cent of average capacity. Bronzes are moving fairly well but demand for ordinary brasses is spotty.

Gray iron shops are averaging less than five days a week. Some, especially the jobbing foundries, are not doing over four days a week. It is notable that some of the heavier work is falling off, such as for machine tools and other capital equipment. However, pressure pipe plants are going well and, until now at least, soil pipe people have been fairly active, with some export work for the government contributing.

Improved business from the automotive and agricultural equipment industries is tending to cushion the easing in malleable casting demand. Railroad equipment orders are down, due in part to inability of car builders to build up rounded steel inventories, and pipe fitting requirements are off. Steel foundry operations are bolstered by continued requirements for defense and defense-support, these needs being estimated at around 40 to 50 per cent.

Raw material supplies generally are in fair balance. This applies particularly to pig iron and cast scrap.

Overall conditions in the New York territory are much the same now that the labor situation has calmed down. For a few weeks during the fall, eight gray iron shops in the northern New Jersey area were closed down by strike.

"What's your suggestion for making more room in the foundry, Jack?"

WEST coast foundrymen do not expect the new administration will bring any significiant change to the industry. Generally, however, foundrymen hope for some relief from governmental controls. It is their view that a freer industry could operate more efficiently but few are willing to forecast an early change.

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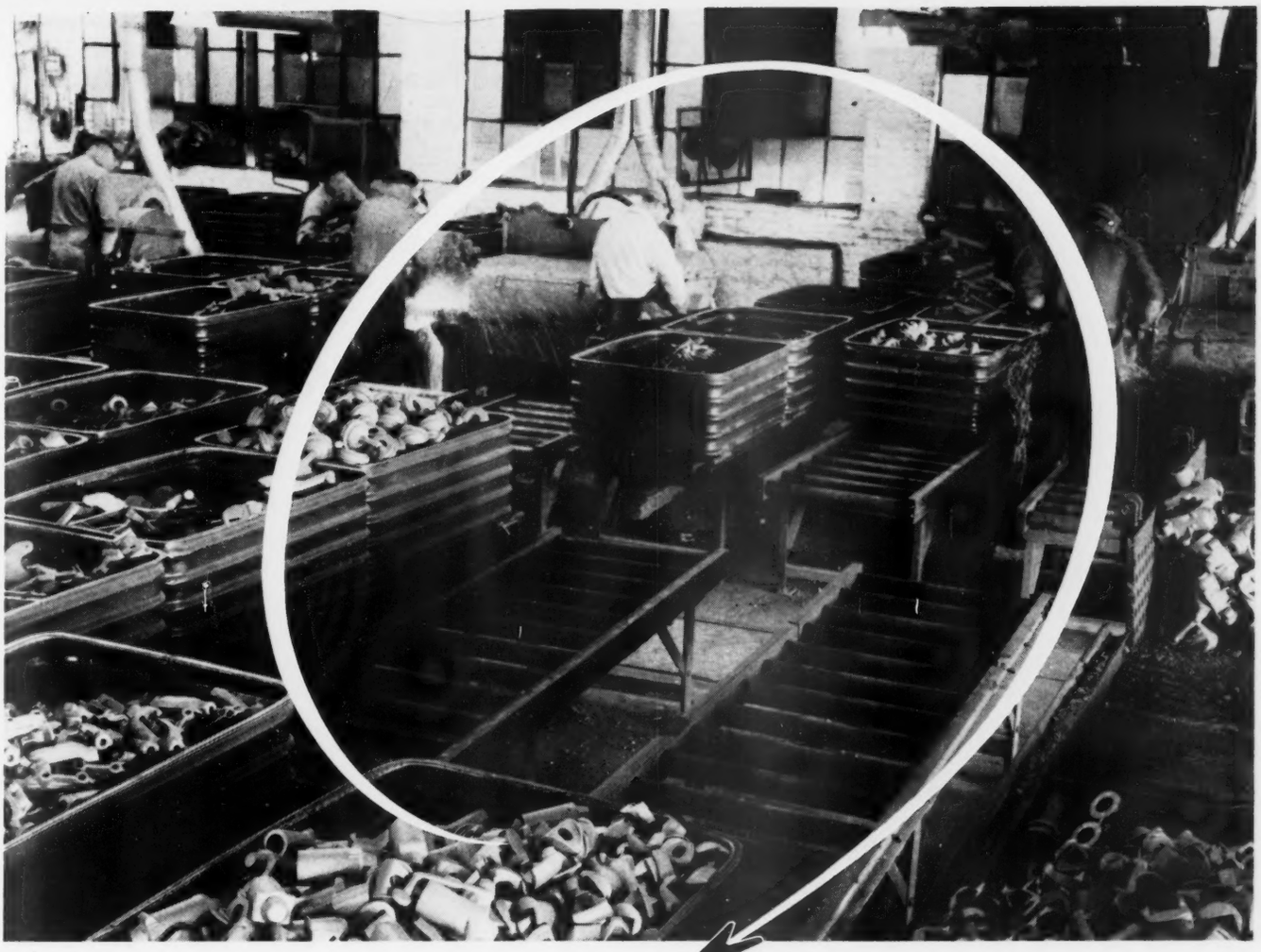

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(*Concluded from page* 136)

Foundry activity is picking up and foundries supplying floor furnaces, heaters, and hardware items to the building trades are at capacity. Soil pipe foundries, in the doldrums for months past, are the busiest for several years. Manufacturers of electric motors and pumps for agricultural purposes are ordering castings in greater quantities. Foundries supplying these requirements are busy. For other iron foundries orders are fewer. Business is spotty for nonferrous foundries supplying the aircraft manufacturers. Aircraft orders are in a constant state of flux and business from other quarters is weak.

The year drawing to a close has generally reflected better business for West coast foundries than did 1951. Activity of nonferrous foundries for the year is about 10 per cent higher than during 1951. Steel foundries say 1952 resulted in 20-25 per cent more sales than last year. Gray iron foundries report volume in 1952 and 1951 about the same.

Major problem facing local foundries is a shortage of all types of labor. The demand for skilled molders and coremakers has always been greater than the supply, but now the pinch is on for unskilled help as well. Foundries here have a difficult time in attracting workers. A nearby concentration of aircraft plants offering high wages and easy work proves intensely attractive to local labor. Foundry wages suffer by contrast with the aircraft plants where an unskilled man with no training can receive up to $2.25 an hour.

Steel foundry wages have risen twice this year with increases totaling 14 cents and average wages for unskilled labor stand at around $1.50 in steel foundries and at $1.25-1.30 in gray iron shops. Average wage of skilled help is about $1.90.

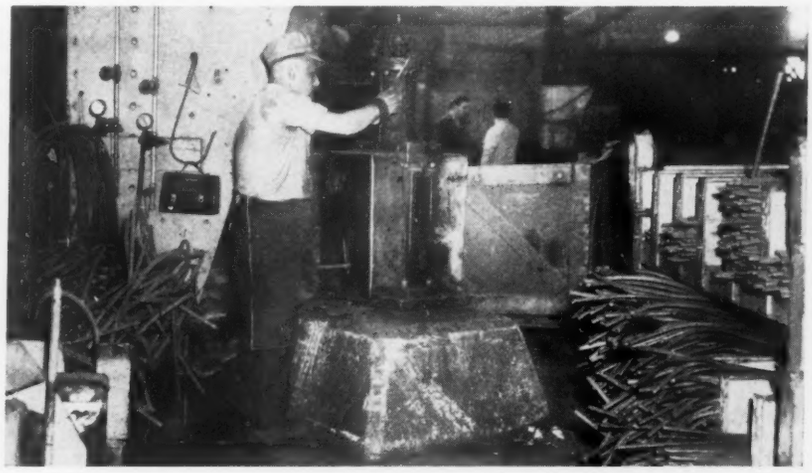
Foundrymen know that to compete in the labor market they must be able to offer higher wages. They would if they could, but limited by wage freezes and with casting prices controlled, their hands are tied.

Book Review

Investment Castings for Engineers, by Rawson L. Wood and Davidlee Von Ludwig, cloth, 477 pages, 6 x 9 in., published by Reinhold Publishing Corp., New York. Price $10.

Logically arranged for reference use, this book offers a comprehensive description of the salient features, advantages and limitations of present-day investment casting processes. Emphasis is on design engineering factors.

Straightening Machine Salvages Core Rods



CORE rods and gaggers are being reclaimed for reuse at the Symington-Gould Corp., foundry, Depew, N. Y., by a salvage setup which has reduced scrap losses and eliminated large piles of material awaiting attention in the sorting department.

The conveyor belt shown below transports rods, chills, gaggers and small particles of steel scrap from a sand reclaimer on the first floor to the second floor, where workmen sort them for straightening. Because steel scrap and broken cores are mixed, a magnetic pulley at the end of the conveyor separates metallic scrap from nonmetallic.

After sorting, the pieces are transported in bins to presses and straightening machines. Among these are two core rod straightener and shear machines manufactured by American Wheelabrator & Equipment Corp., Mishawaka, Ind. Operated by compressed air at 90 psi, each machine straightens one rod at a time with two steel dies, one movable, the other stationary. These close as a contracting square upon the work and straighten it by a blow delivered at once from four sides.

Above, one of these machines is illustrated in action. Both bent and straightened rods are in the bin at the right. Hand operation of a compressed air valve actuates the straightening dies, the shearing mechanism or the gagger former.

Big kinks are removed first in the bending jaws of the machine. One blow afterward by the dies does the rest. If shearing is necessary, it is done on the same machines, one of which is equipped for forming gaggers up to ⅝-in. diam in one operation.

HERE'S NEWS

Making news today is this ring/cement lining developed by CARBORUNDUM for non-ferrous crucible furnaces. It consists of CARBOFRAX silicon carbide rings, 1½" thick, backed up with 2½", or more, of ALFRAX aluminum oxide cement (used for insulation). Operators say that this lining . . .

GOES IN FASTER. Rings are light enough for one man to handle. No hoist is needed. The cement is handled like Portland cement — just mix with water and pour. A full lining can be installed in a couple of hours over a week-end, and be ready to go Monday.

LASTS LONGER. CARBOFRAX rings make one of the most durable linings known. They are inherently resistant to flame erosion, spalling and cracking, and will go many months with little or no patching. Even really high temperatures won't soften them.

CUTS FUEL COSTS. Since the rings are only 1½" thick, there's ample space left for insulation. Moreover, the ALFRAX cement that backs up the rings is one of the best refractory insulating materials available. It provides a low heat capacity furnace and keeps heat loss to a minimum — hence less fuel is needed to turn out more melts.

GIVES EXTRA HEATS. You'll get fast, uniform heating with these linings, and *consistent* time per heat. One extra heat per day, sometimes two, is quite possible.

Why not check up? It takes just a moment to drop us a line. We'll gladly furnish recommendations to fit your needs. We make lining materials — rings, ring segments, and cements — to fit *every* need. Address Dept. A-122, Refractories Division, The Carborundum Co., Perth Amboy, N. J.

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By EDWIN BREMER

Foundry DEVELOPMENTS

LATEST development in methods of producing spheroidal or nodular iron is a report that Allis-Chalmers Mfg. Co., West Allis, Wis., has discovered a successful procedure for causing graphite to assume the spheroidal form in cast iron without the use of magnesium. As disclosed in a talk given by an Allis-Chalmers executive and reported in the *Milwaukee Journal*, the company employs an addition agent of calcium silicide and sodium chloride. While at this writing details are not available, it might be pointed out that calcium is one of the several elements capable of producing spheroidal graphite, but difficulty is encountered in introducing it into molten iron in elemental form, and obtaining satisfactory, consistent results. However, as mentioned in our September column, Kusakawa, a Japanese investigator, found that calcium silicide produced spheroidal graphite in low-sulphur cast iron.

* * *

BRITISH foundry producing manganese (14 per cent) steel castings found that a mold paint or wash for dry sand work which gives satisfactory results is comprised of the following: Ground chamotte 85.2 per cent; proprietary oil 10 per cent; bentonite 2.0 per cent, and molasses 2.8 per cent. One cwt (112 lb) of that mixture is diluted with 18 gallons of water for use.

* * *

IMPROVED method for measuring porosity in metal castings, believed capable of accurately measuring leakage rates as low as 10^{-8} cu ft per sq in. per hr at one atmosphere has been developed by Sam Tour & Co. Inc., New York. Devised to measure the effectiveness of a plastic impregnant in reducing porosity of aluminum castings to be used in high vacuum installations, the technique traps and weighs the quantity of CO_2 passing through a test plate. Pure, dry CO_2 is introduced into a chamber on one side of the plate and maintained accurately at 15 psi gage. In the other chamber on the opposite side of the plate a stream of O_2, free of CO_2, sweeps through at approximately atmospheric pressure. Slight difference in pressure on two sides of test plate permits CO_2 to pass into the O_2 stream when porosity exists. The CO_2 is collected in a CO_2 absorption tube and weighed, and from that and a measured period of time, the rate of leakage can be calculated.

* * *

IN A discussion of grinding wheels, Norton Co.'s *Grits and Grinds*, October issue, points out that where size of wheel permits, consideration should be given to transferring it to one or more smaller, high-speed machines when the wheel has worn down about 4 in. in diam. For example, in one nonferrous foundry the practice is to use a new 20-in.-diam resinoid cut-off wheel down to 16 in. on a swing-frame cut-off machine, then use it on a higher speed floor-stand cut-off machine down to 14 in., and finally transfer it to a third still higher speed machine for use down to a relatively small discarding size.

* * *

SODIUM salt of acrylonitrile, a soil additive or conditioner, which probably will be more recognizable under its tradename Krilium, is being studied as an additive to molding sands. Indications are that it permits better control of sand mixtures through reduction of number of other additive materials, as well as permitting greater latitude in amounts employed and improving control of rammability. In applications as a soil conditioner the chemical compound has the ability of eliminating crusting, permits more rapid infiltration of moisture into the soil, and provides lower rate of evaporation.

* * *

STUDY of the solubility of carbon in austenitic steel by the National Bureau of Standards, Washington, indicates that with a C content of 0.007 per cent solubility was substantially complete between 1300 and 1400° F in type 304 stainless. Solubility appeared to increase linearly from about 1400 to 1975° F, the maximum temperature studied, where carbon solubility was approximately 0.08 per cent. These values of solubility are appreciably lower than those previously reported. Solubility curve developed at NBS indicates that type 304ELC, extra low carbon, can be annealed effectively at 1700°, but that ordinary type 304 should be annealed in excess of 1900° if the carbon is to be dissolved fully.

* * *

BRITISH foundry has developed a coremaking machine which eliminates the necessity of considering the green state properties required for handling before baking, according to *Foundry Trade Journal*. Latter phase is taken care of by a preliminary bake which provides a rigid skin sturdy enough to permit handling to the oven for completion of the baking operation. Cone-shape core is blown in a vertically split box of the same shape. Corebox is held in a chase or form which is heated by a low-frequency induction coil thermostatically controlled, and heat is transmitted to the core by conduction.

Coremaking unit comprises a three-station machine with the coreboxes and chases mounted on a rotary table. One operator blows the core, and the machine is indexed 120° to the second station where another operator ejects the corebox through a ram coming up from below. On ejection the corebox, hinged at the bottom, opens and the operator removes the core. Corebox then is drawn back into the chase ready for the blowing operation. Hot cores are placed on a conveyor belt and sent to the oven for completion of baking. Present machine is said to produce a core a minute, and it is claimed that the speed can be increased considerably by increasing the number of stations.

* * *

GRAPHITE and carbon products serve the foundryman in many ways as indicated in the following resume: In dry powder form they are used as a facing or coating on sand molds; as a component in liquid facings or coatings on sand or metal molds and cores, and in solid form as a mold material or for forming chills as well as a carbon raiser for cast iron and steel. Graphite and carbon in granular form are used as an ingredient in plastic refractories as well as in brick for lining cupolas, ladles and spouts, and as a ladle inoculant for cast iron. Powdered graphite forms an excellent lubricant in elevated temperature operations such as in continuous core ovens or on core buggies in batch type units. Carbon bricks are used in tapholes of basic-lined cupolas.

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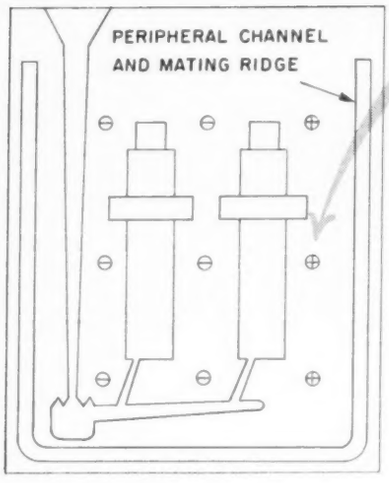

FIG. 1

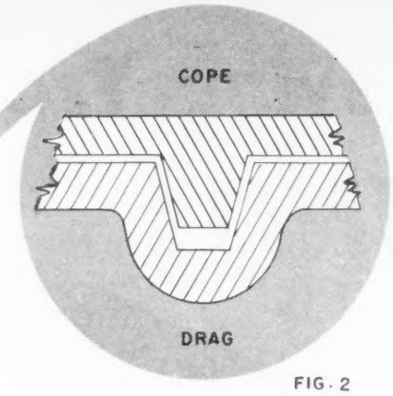

FIG. 2

Fig. 1—Shell mold showing nine point supports for matching the cope and drag. These are shown in enlarged cross-sectional view in Fig. 2. A ridge and channel may be provided around the entire edge of mold if desirable

New Method Simplifies

SHELL MOLD ASSEMBLY

By RICHARD HEROLD

Manager, Foundry Products Department
The Borden Co., Chemical Division
New York

HOW extensively the shell molding process will be adopted will depend ultimately on how low costs can be pushed in applying it to production. The less it costs, the more widespread its application.

As with any new development, the path of shell molding is faced with many obstacles. One of these has been the problem of providing an efficient and economical method of shell assembly. Recently a new and simple yet effective method of assembly has been devised. Perhaps, since the assembly of shell molds by pasting has already become an accepted practice, we should refer to the new development as a greatly simplified method of applying the adhesive to the shell so that it becomes a single motion rather than a series of motions.

The technique in question involves, among other things, pattern design and is readily adapted to all patterns having their parting lines in one plane.

A little background discussion is in order. The use of bolts and nuts, as well as rivets, spaced strategically about the mold cavity and sprue of shell molds, as illustrated in Fig. 1, has proved highly satisfactory from the standpoint of adequate mold support, minimizing mold swelling and finning, at the same time making for a more accurate casting. However, the cost is admittedly high and the method very time-consuming—to the extent of actually creating a production bottleneck.

An improved method of securing the same desirable mold support at lower cost and greater speed is as follows:

As in the case of bolting or riveting, we shall still rely on what might, for lack of a better expression, be referred to as point support as illustrated in Fig. 1. We shall employ the device of male bosses on the cope half and female recesses on the drag half. A cutaway profile of cope and drag appears in Fig. 2. Measurements are only approximate. The recesses should be deeper than the length of the mating boss so any excess adhesive will have a place to go other than to the parting line.

A necessary part of the technique is a suitable adhesive in liquid form. Such an adhesive must be easily handled, inexpensive, fast setting (20 to 90 seconds with warm shells), and capable of a sufficiently strong bond when cured that no supplementary clamping is necessary. For this work, Borden's Thor Shell Paste TP-22 and Accelerator TA-102 were employed successfully, giving a bond stronger than the individual shells. The glue was mixed with the accelerator and cereal plus water, in the following proportions (all parts by weight):

Paste 10 parts, corn cereal binder 1.2 parts, accelerator 2 parts, water 6.5 parts.

Equally necessary in this new method is a glue holder which is designed with a device to maintain the liquid adhesive at a predetermined level, as indicated in Fig. 3. The holder provides a glue depth of 3/16-in. Since the bosses of the cope were 5/16-in. long, the adhesive could never reach the parting line of the shell proper. Thus, it was impossible for the glue to get into the mold cavity or the sprue.

In practice, here is what happens: A freshly stripped drag, or one from storage, is set up with cores in place. For speed of glue hardening, a drag temperature of 150°F is desirable. It is moved to the gluing station where a cope to match (temperature at 150° to 200°F preferred) has likewise been delivered. The cope, with male bosses pointing downward, is dipped either manually or mechanically into the adhesive holder (Fig. 4). Since the

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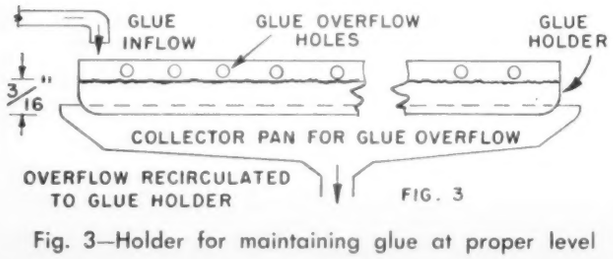


FIG. 3

Fig. 3—Holder for maintaining glue at proper level

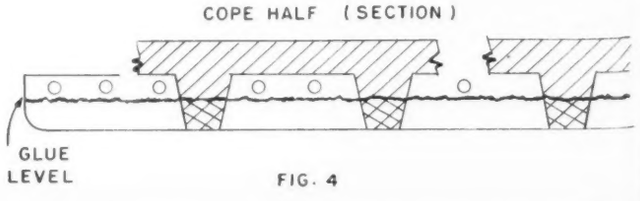
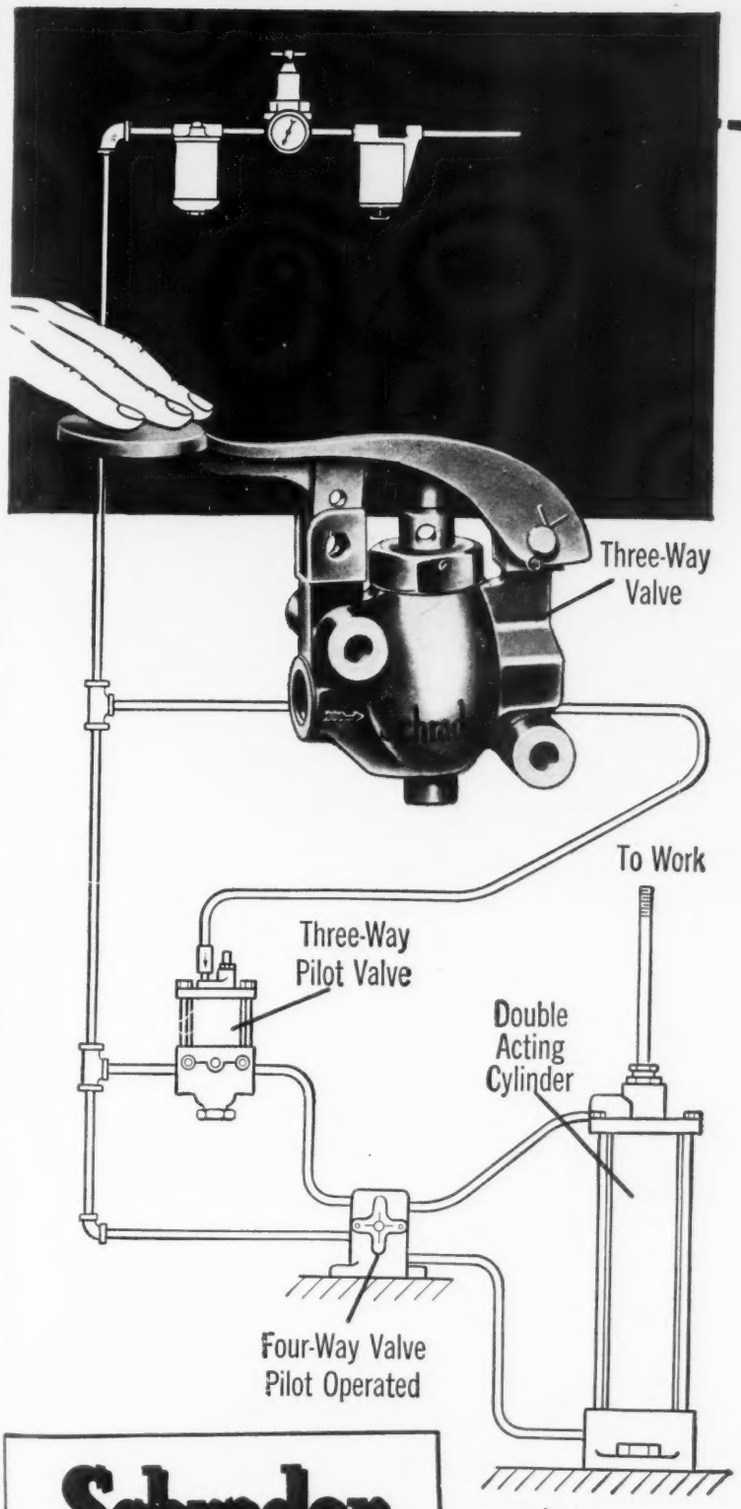


FIG. 4

Fig. 4—Dipping cope, with bosses down, into holder



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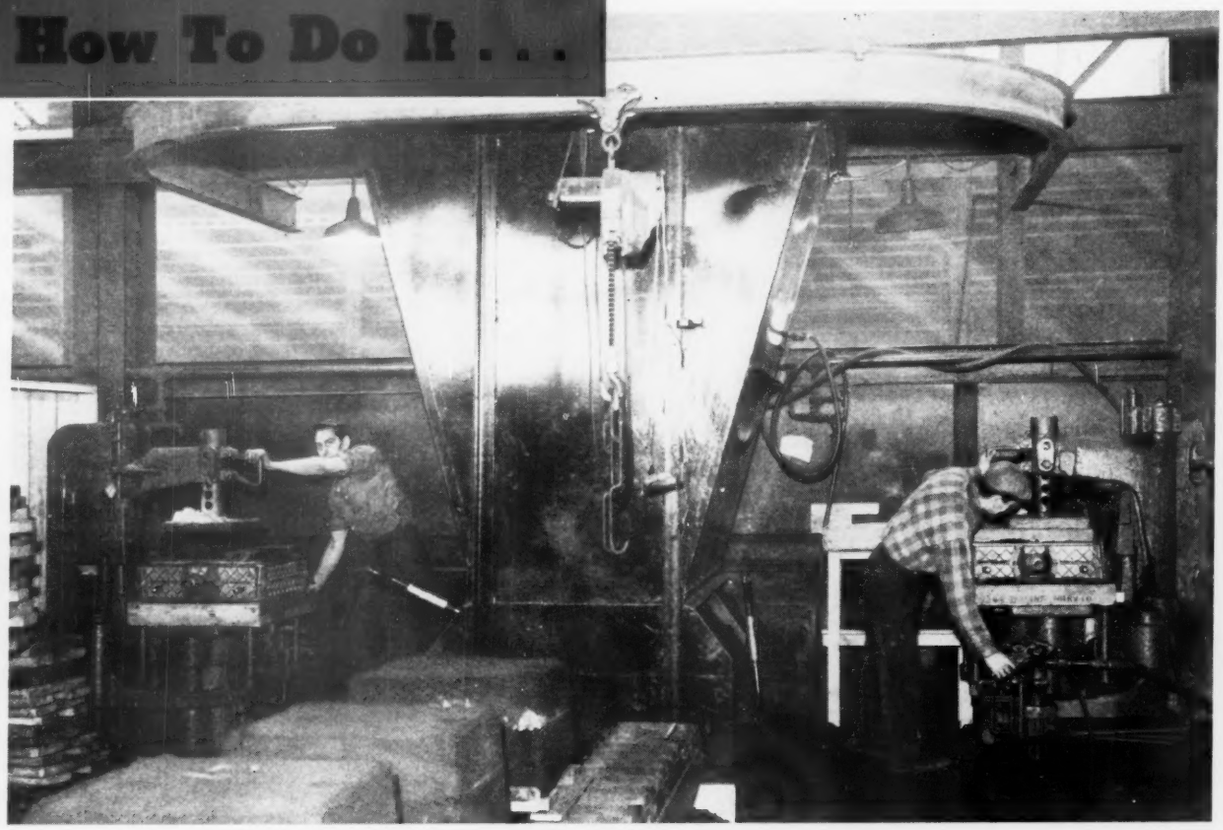

U-Shaped Monorail Section Feature of Molding Unit

By L. D. PRIDMORE, president, International Molding Machine Co., La Grange Park, Ill.
as told to ROBERT H. HERRMANN, associate editor, FOUNDRY

MOLD-MAKING and assembly unit features a U-shaped section of monorail on which rides an electric hoist for transporting copes and drags and assembling molds on the central roller conveyor shown in foreground. The unitized set-up contains a sand hopper located inside the U of the monorail for servicing the two molding machines. Copes are produced on one of the machines and drags on the other. A leg of the monorail is located directly over each molding machine. Consequently, the hoist can pick up a completed drag and transport it to the central roller conveyor, then roll around to pick up the cope and deposit it on the drag to complete the mold. Finished molds are pushed along the roller conveyor to the pouring area.

Do you have any tricks of the trade tucked away with your foundry experience? Why not release them to fellow foundrymen? FOUNDRY will pay a minimum of $10 for each idea submitted and published. Send a photo or drawing with your idea

(*Concluded from page* 152)

glue is just 3/16-in. deep, only that amount of adhesive goes on each boss—but all in *one* motion and with no delay. The cope is immediately withdrawn from the adhesive and placed on the waiting drag. Small sand bags or bags of shot are placed on top of the assembled mold and left there briefly for the glue to dry.

Molds so assembled and dried may be poured off without additional support if the casting sections and sprue are small—less than ½-in. for casting wall thickness and under 1 in. for sprue diameter (assuming gray iron is being poured and that total weight of sprue and castings does not exceed 15 lb). Heavier castings may require shot, sand or gravel back-up. Under any circumstances, the glued assembly makes for reduced or eliminated swelling and finning, and more accurate castings.

If it seems desirable to seal the entire edge of the shell mold in addition to the points of contact previously referred to, one can readily incorporate a ridge and mating channel (see Fig. 1) on the cope and drag, respectively, by pattern modification. In such a case, the height of the ridge and depth of the channel should match the pattern bosses and recesses.

Aside from simplicity, this technique has the advantage over previously used gluing methods—where the adhesive is applied at the parting line—of being consistently more accurate. This is true because, with the new method, parting faces are in contact—not separated .003-.007-in. by an adhesive layer.

Although there will be some slight increase in pattern cost resulting from this method, operating economies will more than offset the pattern costs involved.

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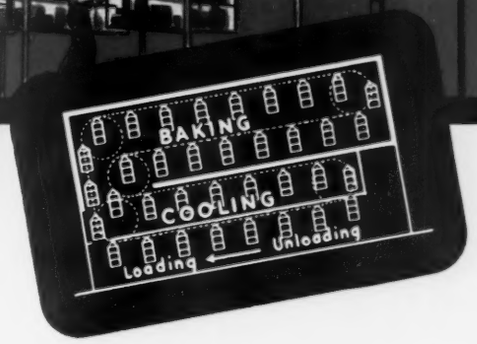
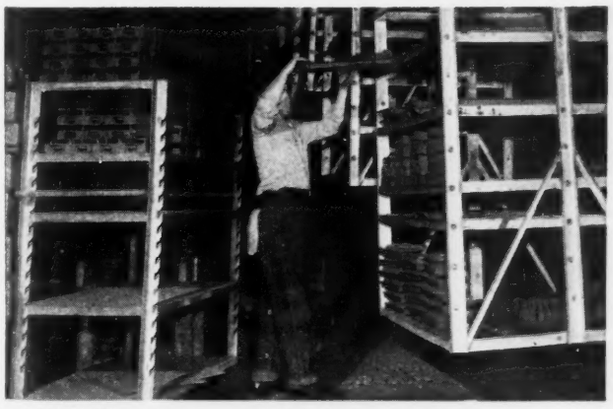
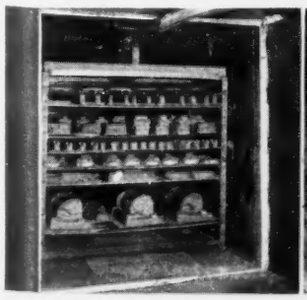
ELEVATED CONTINUOUS CONVEYOR CORE BAKING OVEN

DESPATCH combination gas-oil fired oven, 13 ft. wide, 27 ft. high, 52 ft. long. Has variable speed continuous conveyor. Cores make horizontal passes thru bake chamber, (see diagram) then enter fan-equipped cooling section.





DESPATCH conveyor ovens help boost core output-per-man as loading and handling are greatly simplified. Foundrymen appreciate the labor-saving features of DESPATCH Conveyorized Ovens.



Intermittent monorail conveyor DESPATCH oven with swing doors at both ends.

DESPATCH core and mold oven with heavy duty, electrically operated lift door.

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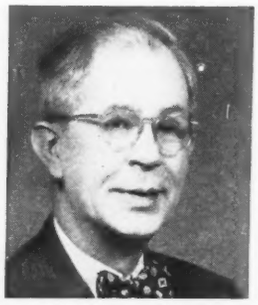
MAN-TO-MAN

on the Molder's Bench

"National Pattern Memorial Day"



By RALPH L. LEE

LET'S NOT say that the Lee Hobby Foundry doesn't like visitors, for it does. In fact, we go clear out of our way to invite them and to show them a good time when they come. But there is something nice to be said about those times between visitors when we can settle down to the jobs at hand and get into them clear up over our ears.

There's been a stretch of over a week now when I've had no meetings to attend and no trips and speeches to make, and even Mother has run low on chores for me to do. (Mother said this is an overstatement because she still has plenty for me to do. She just hasn't told me.) So I've been having some good, clean, wholesome fun getting some things done that I've been trying to get to for a long time.

For instance, there's the insulation for the underside of the roof over the pattern shop. Been toying with this idea for quite a spell, but balancing the cost of the darned stuff against the possible saving in fuel oil, together with the shorter warmup periods between off-the-job duties and trips, left me somewhat on the fence. But the superintedent (Mrs. Lee) asked why I didn't quit dilly-dallying around and get it over with. So I did.

The loft isn't high enough to stand up in, and tacking those mineral wool blankets to the rafters close in under the eaves had me on my back, rolling from side to side all covered with dust and bruises. But, as usual, I got the hang of the job on the last few strips and could have gone on from there with half the effort and time.

The job in the loft didn't end with the insulation. It turned into a drastic house-cleaning job. Odd-sized flasks, boards and patterns are kept up there. Some of those flasks were really works of art. I'm sure glad they were hidden away so no one could see them. I chucked them out with a vow never to repeat the asinine mistakes and slipshod compromises I had made on them. So help me, I'm not going to mess around with claptrap contraptions like those any more. It certainly was good, though, to review the past as far as flasks—yes, and boards—are concerned.

Then I got around to the patterns. I swear, it's hard to believe the way they can accumulate and even harder to understand why in Heaven's name I kept most of them. As I tackled the job of weeding out the patterns I knew we would never use again, my mind went back to the morgue we used to have in the engineering department at the National Cash Register Co. in Dayton, O. This morgue was filled with the Goldbergs, the fizzles and the flops we had turned out over the past years—not all of them, of course. There wouldn't have been enough room for more than the outstanding examples.

The thought was that when we went about a new job which recalled something on the same order 'way back, we would go to the morgue, usually with the boss or some old-timer, and review past mistakes and maybe pick up some good things that had been smothered by the bad company they had kept.

As a young fellow I used to wander through the morgue all by myself. I found that it knocked out any cockiness that may have been building up in me, and it showed me that a lot of water had gone over the dam with plenty of brain-hours and experience floating in it.

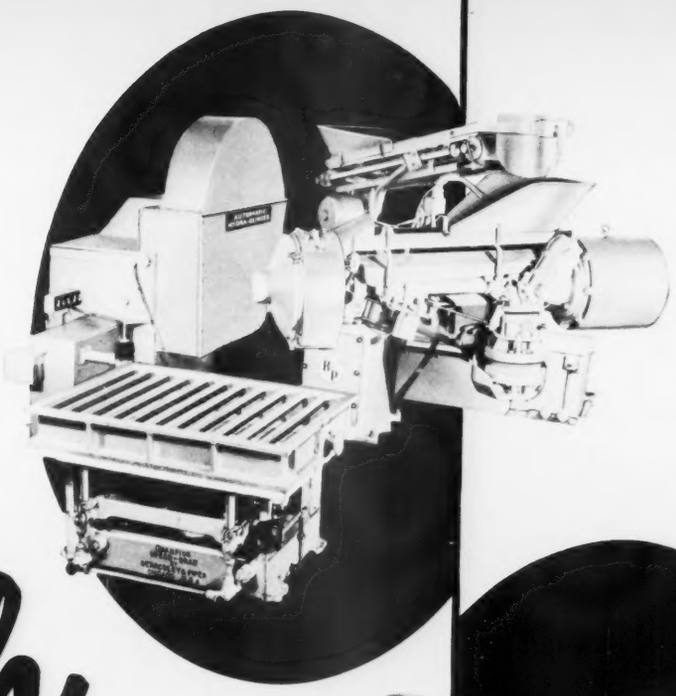
In a way I felt kind of good looking over the patterns I had made the last 12 years, for the latest showed up pretty good in contrast to the earlier. On the other hand, I didn't feel so good when I saw unmistakable proof that I had made some mistakes over and over again. In the light of this pattern review I believe that impatience to get castings in a hurry was responsible for most of these repeaters, for I remembered that in each case I had had a hunch that I had been through the same experience before, but was just too darned lazy to look up the old job and get the specific dope. While it's amazing what a person can remember, it is also amazing what a person can forget.

As a result of my pattern review, I have decided that I'm going to fight childish impatience when it comes to waiting for shellac or lacquer to dry. I'm also going to hold my horses and wait till the glue is dry before I coat my patterns. And one thing I'm sure of—I'm going to put enough coats of shellac or lacquer on the patterns so that the sand won't stick to them. My gosh, what a difference a good pattern finish can make in a molding job and in the looks of the finished casting!

I've also decided to mend my ways when it comes to the sharpness of the parting line on a plate pattern. When I think of the time I've wasted grinding off fins, I feel like kicking myself in my britches. Another thing I'm going to do on loose patterns is to make follow boards, or at least follow sections, so that I won't have all that hand tooling. I honestly believe that even on a few castings, the little extra time it takes in the pattern shop, with the tools and dimensions all out, pays off big in molding. And boy, what a difference it makes in the finish of the casting!

I've already made an assortment of runner patterns, for I've found that by the time I smooth up a runner,

(*Concluded on page* 151)



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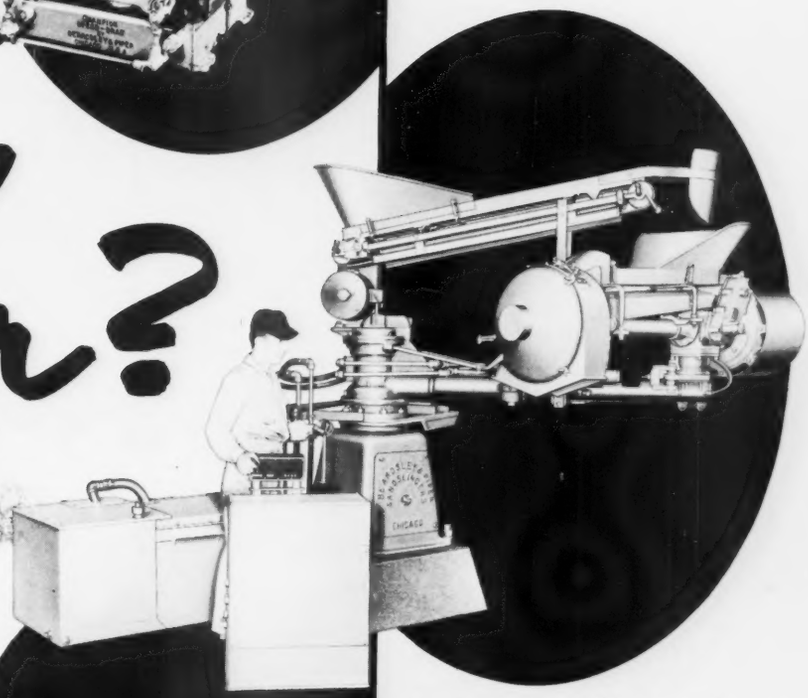
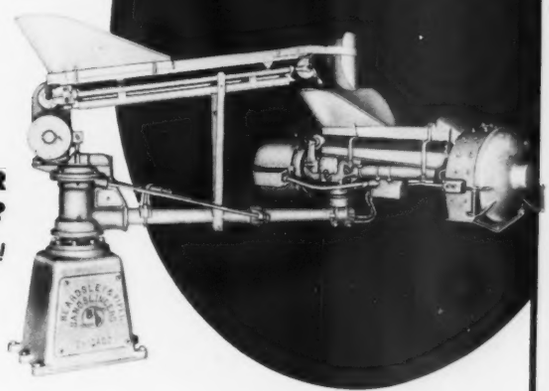
Which Slinger?



PRODUCTION WORK?
Ram with the Hydra-Slinger!



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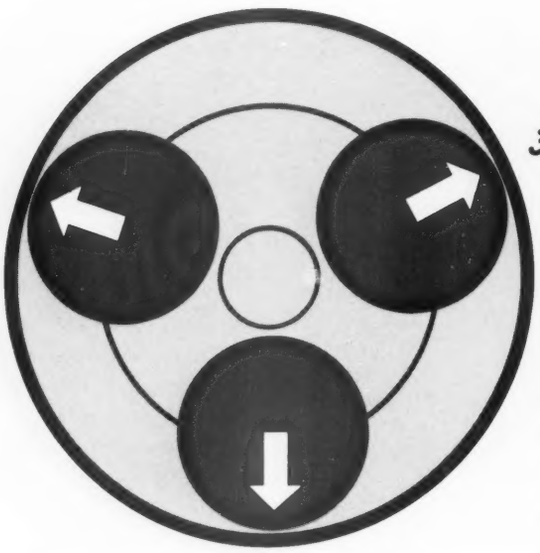
it's a matter of PRESSURE



32.7 p.s.i. ****(compared to 31.5 p.s.i.* in the very latest style of conventional mixer)*** **Using the same basis of computation.*

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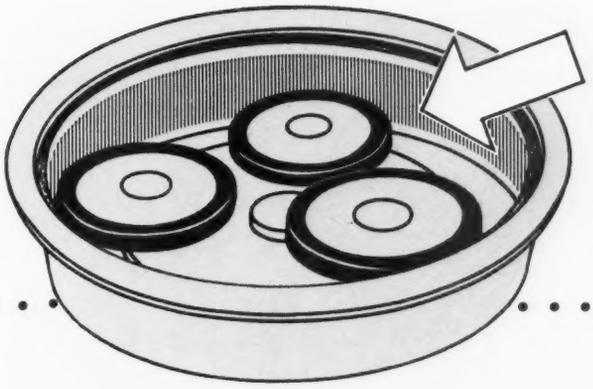


***210,000** square inches per minute of area covered (compared to 78,000 square inches per minute in the latest conventional mixer)*

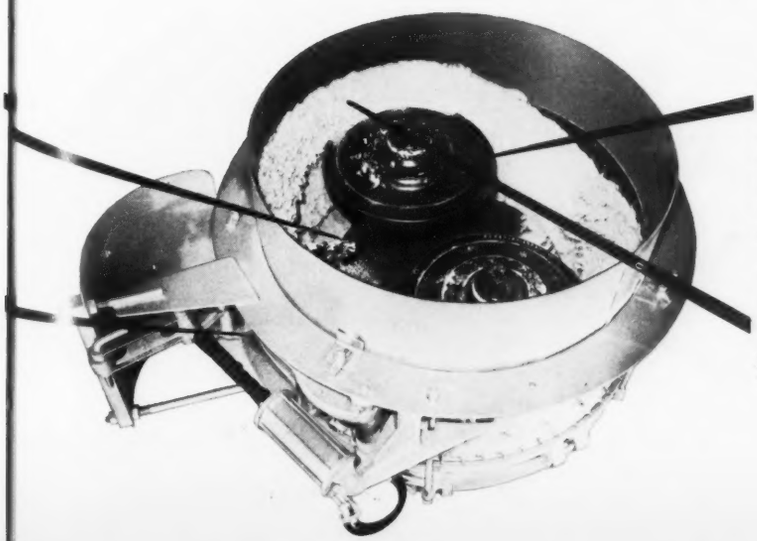
and AREA COVERED

***3** times the area results in*

***3** times the mulling per minute!*

The necessarily slow-moving mulling wheels of the latest style conventional mixer cover a mulling area of 78,000 square inches per minute. Since mulling pressure (and therefore the mulling work) can only be applied over the area contacted, this area absolutely limits the amount of mulling that may be done. In the Speedmullor, light-weight mulling elements permit high speeds. The mulling wheels are horizontally mounted, so that the greatest mulling path area is utilized. The three high-speed mulling wheels of a Model "80" Speedmullor cover 210,000 square inches each minute.

g with the SPEEDMULLOR!



Centrifugal force is utilized by horizontally-mounted, light-weight, high-speed mulling wheels. Spring-loading, another mulling principle which was originated by Beardsley & Piper in 1944 (although an excellent method for portable mixers such as the Mulbaro), is not nearly as efficient as the high-speed centrifugal method used in the stationary Speedmullor.

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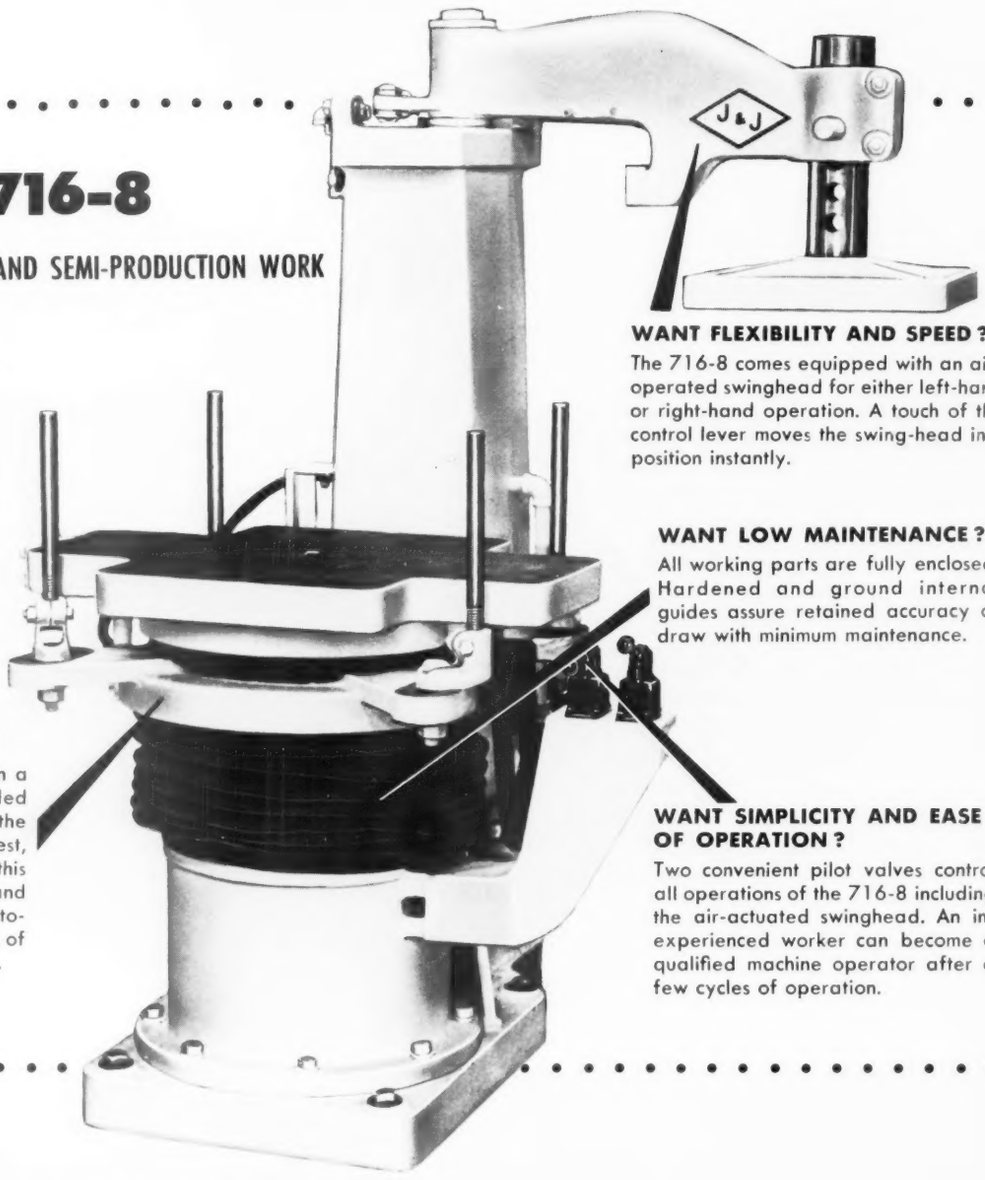

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MOLDING MACHINE DIVISION
THE JOHNSTON & JENNINGS COMPANY
Division of Pettibone Mulliken Corp.
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(*Concluded from page* 146)

cut by hand, the way it should be, these patterns are a darned good bet. I've gotten a lot of dirt in my castings by not doing a job on the runners and gates. Speaking of gates, I'm even going to make some more standard patterns for them so that there will be round corners where the metal goes into the body of the casting. What a difference those rounded-off edges make!

Another thing I'm going to do. I'm going off the deep end into split patterns. "Old Split Pattern Lee' they'll be calling me. I've found that it's just as easy in most cases to make split patterns as it is to make them solid.

One thing that gave me the creeps when I looked over the morgue was a pattern that had been all chawed up by my rapping through a hole in the cope on a hit and miss basis. I've made me three sizes of rapping tools with wood screws soldered into the ends, and I drill a little hole in the pattern for them. I find that with care, even in soft wood, I can do a much better job of rapping with those screw points than I can with those old ice picks. Deciding where the hole is going to be and drilling it there before the pattern goes to the foundry is a habit I've decided to get into.

Another thing I've discovered is that I'm making headway in more nearly finishing pieces of patterns before I assemble them. I find that I can round off corners much more easily out in the open than by reaching way down into pockets. The same thing is true for sanding, too.

I expect I'm getting to be a fanatic about finishing all surfaces of my patterns. My, what a difference it makes, though, in molding and in the finished product. It seems that molten metal just loves to nestle down into smooth sand cradles.

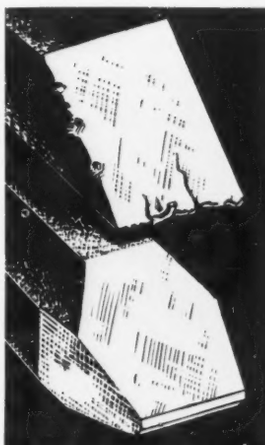
I'm going in strong for master layouts and templets, even for little peewee patterns, with sort of a draft strategy all thought out to begin with and rigging up to check them accurately and quickly.

As an amateur, I guess I'm like the old negro Boss Kettering of General Motors talks about who said, "Us folks dat ain't got no edjikashun sho has to use our haids a lot." I really should apologize to the patternmakers and old-time foundrymen for talking about all this ABC pattern stuff. I really hadn't intended to get into all this detail about my pattern loft experience. All I intended to do was to suggest that it might be a good idea now and then for even professionals to get out into pattern storage and check memories against the patterns of past failures and successes.

Maybe we ought to start a pattern memorial day (there's one for almost everything else) on which all good patternmakers and foundrymen will march in solemn procession into the pattern cemetery, where, with uncovered heads and a few moments of silence out of respect for the patterns which have passed on, their obituaries will be reviewed and the ways of the mourners mended (we hope).

ASTM Year Book Out

American Society for Testing Materials, 1916 Race St., Philadelphia 3, has published its annual *ASTM Year Book*. Containing 628 pages, the book lists members of the society as of September, 1952 alphabetically as well as geographically. In addition, memberships of the society's 73 technical committees are given as well as information on past and present officers, charter, by-laws, regulations, awards and lectures.



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SUPERVISORY DEVELOPMENT CONFERENCE

Held by Malleable Founders' Society

By JACK C. MISKE
Assistant Editor
FOUNDRY

THE key role of foremen in management-worker relations, and the means whereby an adequate supply of capable foremen can be assured, were discussed by the Malleable Founders' Society at a Supervisory Development Conference, Oct. 10. The meeting, held at Hotel Cleveland, Cleveland, attracted more than 60 members.

William J. MacNeill, chairman of the society's Personnel and Plant Operations Committee and vice president in charge of operations, Badger Malleable & Mfg. Co., South Milwaukee, Wis., presided and was the first speaker. Discussing "The Foreman's Importance," Mr. MacNeill stressed that employers need to communicate their good will to employees if it is not to be lost and that the foreman is the key to that communication. He contended that foremen who are chosen because they are good producers or mechanics often are not diplomats and leaders. In the latter capacities, he said, foremen should recognize the best in workers, assume responsibility, understand and transmit business fundamentals, keep informed about equipment and methods, help workers to be satisfied and maintain their own reputations.

Discuss Foreman Development

Next on the program was a panel discussion on "Selecting and Training Foremen" presided over by R. V. Righter, manager, Saginaw Malleable Iron Plant, Central Foundry Division, General Motors Corp. The first speaker was P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill., who read a paper prepared by G. J. Behrendt, Eastern Malleable Co., Wilmington, Del., and Naugatuck, Conn., who was unable to be present, and went on to discuss supervisory development in his own plant.

Mr. Behrendt's paper described a supervisory school conducted by his company to indoctrinate men and to help management understand their capabilities and interests. Participants spend 2 to 24 weeks in each department over a two-year period.

Speaking of his own firm, Mr. DeBruyne stated that its foremen are always picked from the ranks. Character and personality are carefully considered, and the men chosen must be under 35 and interested in their community. The company wants foremen to know workers well and to make them feel secure to the point of helping them with their family problems.

Cal C. Chambers, president and general manager, Texas Foundries Inc., Lufkin, Tex., talked from notes prepared by R. S. Bradshaw, vice president and production manager, Texas Foundries, who also could not attend. Mr. Chambers enumerated the sources from which his organization gets foremen and discussed the degrees of success it has had with them.

There are three basic sources: Present workers ready for upgrading; new, young local workers, and university graduates. His company originally tried to staff supervisory jobs with local personnel, but found it necessary to go to the colleges, where it hired engineering students as juniors and gave them summer work, senior scholarships and special training. This program has proved disappointing, Mr. Chambers said, because the boys seem to lack patience enough to learn fundamentals and to work up gradually. Many of them stay for a year or so and then begin to shop around on the basis of their "industrial experience."

The company's latest policy is to encourage local high school boys to take summer employment. Those who come back for a second year are given help, eventually college scholarships if they merit them, with the hope that this policy will result in a future body of interested, ambitious, capable, local leaders.

Before introducing the next speaker on the panel, Mr. Righter made some remarks about General Motors' handling of college men. He said that they are blended about equally in training programs with plant men. These groups work from 6 a.m. to 2:30 p. m. and get instruction equally from plant and outside people from 3 to 5 p. m., twice a week. Once a month there is a discussion of labor relations.

The last panel speaker was Warren Ganong, director of training, Methods Engineering Council, an organization of consultants in industrial management. Mr. Ganong asserted that there are tried and proved methods of selecting foremen which research shows to be 90 to 95 per cent valid. His contention is that personnel appraisal tests that yield "risk ratings," indicating probable effectiveness of men in given jobs, produce results of that order. Such tests, he stressed, should be used to supplement personal judgments and are particularly valuable in conjunction with the judgments of committees, as opposed to those of individuals.

In subsequent discussion it was indicated that there are times when some workmen can earn more than their foreman. This situation is regarded as contributing to the difficulty of persuading good men to become foremen and hurts their effectiveness once they are promoted. Another deterrent is the fear of potential foremen that they will lose their seniority should they step up but subsequently be demoted.

Human Relations Are Basic

The first afternoon speaker was Paul Moore, head of the Department of Business and Industry, Michigan State College, Lansing, Mich., who talked about "Preventing and Analyzing Problems." He singled out neglect of human relations as responsible for 80 per cent of personnel problems. Human relationships are as strong as the first link, he said, and no third person, like a personnel director, can correct friction between employees and foremen.

He named four points necessary to good relationships—letting each worker know how he is getting along in terms of what his responsibilities are and how he is discharging them; giving credit where it is due; letting people know in advance about changes affecting them; and encouraging participation. He claimed that workers want only the right to be heard, not to make decisions, and that there is no substitute for interest in human beings.

The next topic was "Holding the Worker's Loyalty," discussed by Charles H. Smith Jr., president, Steel Improvement & Forge Co., Cleveland. Mr. Smith believes that the most important problem facing industry is how labor and management can get along together, and his talk concerned suggestions as to solutions based on his own organization's experiences. Mr. Smith favors the complete withdrawal of government from labor relations. He further wants collective bargaining to be done on the local level, so that each plant management

(*Concluded on page* 154)

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(*Concluded from page* 152)

can deal with its own employees. He added that management must get honest, factual information to employees about company problems and policies in terms of their meaning to the employees. His last point was that workers should be informed as to what their work does so that they can realize its value.

The next speaker, Robert W. MacDonald, of the law firm of Seyfarth, Shaw & Fairweather, Chicago, spoke on "Understanding and Using the Union Contract." He discussed the position of foremen and supervisors in a company's labor relations and pointed out that since foremen are on the front line of labor relationships, they need training to enable them to perform adequately. Particularly, they must know current union contracts and the history of changes from the original.

The speaker said foremen should have management consciousness and know how to think about the contract and to use imagination in their interpretations of it; they should be able to put labor relations on a personalized basis so that they know the men under them and how they think; and they should try at all times to anticipate employee's problems.

The final speaker was Charles Gaking, staff assistant, training, American Steel & Wire Division, U. S. Steel Corp. Mr. Gaking described various types of training programs for both large and small organizations and suggested that small firms might enlist the aid of the American Society of Training Directors and educational institutions to co-operate in setting up joint training programs for foremen.

After dinner and entertainment by the Karamu Quartet, the members heard Glen Massman, executive secretary, Foremen's Club of Dayton, discuss "The Management Team" and the foreman's place on it.

Asks for 84 Million Ton Coke Capacity by 1954

Expansion of the capacity of coal chemical coke ovens to 84 million net tons by the end of 1953 was called for by Defense Solid Fuels Administator Charles W. Connor at the annual meeting of the American Coke and Coal Chemicals Institute held at the Greenbrier, White Sulphur Springs, W. Va., Sept. 22. Achievement of the goal would, he said, necessitate an increase in coke capacity of about 10 million tons over 1951 level. Such a capacity, together with the production of beehive ovens, will be required to supply the coke needed for making castings, pig iron, ferroalloys and for other purposes.

"In order to provide equitable financial assistance to coke producers who engage in coke oven construction programs," Mr. Connor went on, "the Defense Solid Fuels Administration has established policies covering its recommendations for accelerated tax amortization of integrated coke plants, merchant and utility plants and beehive plants." He stated that 104 applications, for a total of about $667 million, had been received for accelerated amortization of coke plants and related facilities.

In terms of final action by the Defense Production Administration, which has the final authority to certify or deny applications after they have been referred to DSFA for analysis and recommendation, coke facilities costing an estimated $550 million have been certified. About 75 per cent of that cost can be written off by accelerated tax amortization, and these certified projects will provide about 17½ million tons of coke capacity. The gain is not net, however, because over 10 million tons of old oven capacity is being dismantled.

Meetings of Interest to Foundrymen

Dec. 3-5—Society for Experimental Stress Analysis, annual meeting and exhibition, Hotel McAlpin, New York

Dec. 4-6—American Institute of Mining & Metallurgical Engineers, electric furnace steel conference William Penn Hotel, Pittsburgh

1953

Jan. 19-22—Plant Maintenance Show and Conference, Public Auditorium, Cleveland

Jan. 23—Malleable Founders' Society, general society meeting, Hotel Cleveland, Cleveland

Feb. 6-7—California Regional Foundry Conference, sponsored by Northern California Chapter, AFS, and University of California, with meetings at the university and at the Hotel Claremont, Berkeley, Calif.

Feb. 12-13—Wisconsin Regional Foundry Conference, sponsored by Wisconsin Chapter, AFS, and University of Wisconsin, Schroeder Hotel, Milwaukee

Feb. 16-19—Second Annual Industrial Ventilation Conference, co-sponsored by School of Engineering, Michigan State College, and Division of Industrial Health, Michigan Department of Health, at Kellogg Center, Michigan State College campus, East Lansing, Mich.

Feb. 19-20—Southeastern Regional Foundry Conference, sponsored by Birmingham, Tennessee, and University of Alabama Student Chapters, AFS, Tutwiler Hotel, Birmingham

Mar. 2-6 — American Society for Testing Materials, spring meeting, Statler Hotel, Detroit

Mar. 11-12—Foundry Educational Foundation, annual TAC-UAC conference, Cleveland

Mar. 17-18—Steel Founders' Society, annual meeting, Edgewater Beach Hotel, Chicago.

Mar. 23-27—American Society for Metals, western metal congress and exposition, Pan-Pacific Auditorium, Los Angeles

Mar. 31-Apr. 2—Magnesium Association, international magnesium exposition, Washington National Guard Armory, Washington

Apr. 9-10—Malleable Founders' Society, fourth annual market development conference, Cornell University, Ithaca, N. Y.

May 4-8—American Foundrymen's Society, annual convention, Chicago

May 18-22—Material Handling Institute, fifth national materials handling exposition, Convention Hall, Philadelphia

June 8-10—Malleable Founders' Society, annual meeting, Homestead, Hot Springs, Va.

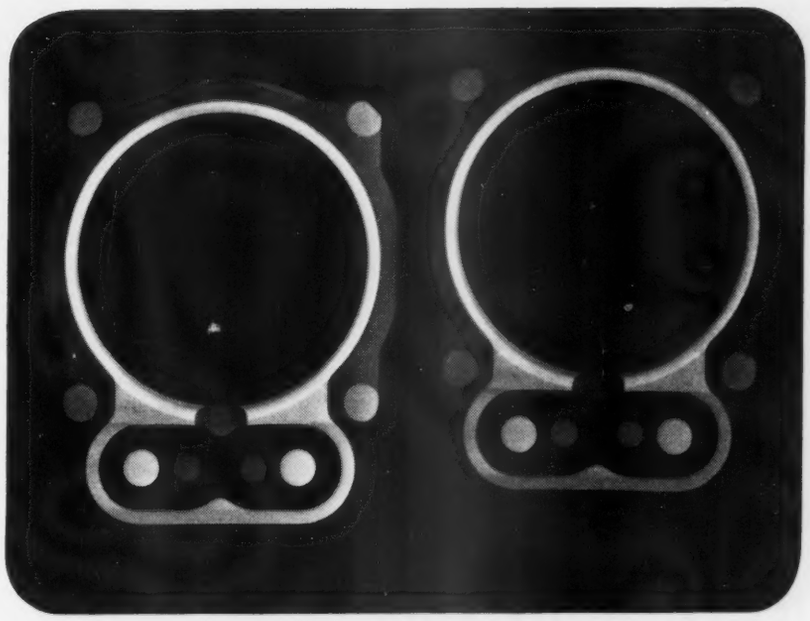
June 29—July 3—American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City

Sept. 21-22—Steel Founders' Society, fall meeting, Homestead, Hot Springs, Va.

Oct. 8-9—Gray Iron Founders Society, annual meeting New Hotel Jefferson, St. Louis

Oct. 15-17—Foundry Equipment Manufacturers' Association, annual meeting, Greenbrier, White Sulpur Springs, W. Va.

This casting must accept responsibility



Radiograph of flight instrument part

—RADIOGRAPHY SAYS IT CAN

WHERE this casting goes, strains are measured in G's, speeds in machs, and altitudes in tens of thousands of feet. And the instrument of which it's a part must be sturdy and dependable to help guard the safety of a costly craft and human life.

So to be certain this part—together with other parts—is sound, it is radiographed. No flaws can lie hidden to cause failure—or to consume costly machining time before being discovered.

Radiographing castings is becoming routine in more and more progressive foundries. It lets them know that only high-quality castings are released. It frequently shows how casting methods can be changed to increase yield in production runs.

You can find out how radiography can improve operations in your plant by talking it over with an x-ray dealer. And we'll be glad to send you a free copy of "Radiography As A Foundry Tool."

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Out of town pattern buyers are becoming familiar faces in Buffalo. Here they have discovered a profitable wedding of the *new* and the *old* that is fast becoming the talk of the foundry world.

The *new* part of this discovery is a *more complete* Engineering service that minutely plans *every* detail of *every* job. Coupled with this more thorough planning is the old fashioned type of fine Craftsmanship that is never satisfied with anything short of perfection. This is a combination you can't beat and it pays off for the foundry, too! Buffalo Patterns *never* require any adapting or extra rigging! They fit your plant and production schedules like a pair of "old shoes". . . And once in production, you'll find that Buffalo equipment will introduce you to the lowest scrap ratio you've ever experienced.

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Just let us know when you are coming to Buffalo on pattern business. One of our cars will meet you at your plane or train and transport you to our club where you will be our guest during your stay.

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DESIGNERS AND MANUFACTURERS OF PATTERN EQUIPMENT FOR OVER HALF A CENTURY

FOUNDRY EQUIPMENT MANUFACTURERS

Hold 34th Annual Meeting

By FRANK G. STEINEBACH
Editor
FOUNDRY

WORK of various association committees, and problems occasioned by government controls, were considered by members of the Foundry Equipment Manufacturers' Association at the 34th annual meeting held at the Greenbrier, White Sulphur Springs, W. Va., Oct. 16-18. Attendance was the largest in the association's history.

Claude B. Schneible, president, Claude B. Schneible Co., Detroit, was elected president of the association and W. B. Wallis, president, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, was named vice president. Arthur J. Tuscany continues as executive secretary-treasurer. New directors are as follows: P. F. Bauer, Allis-Chalmers Mfg. Co., Cincinnati; G. E. Seavoy, Whiting Corp., Harvey, Ill., and Claude B. Schneible.

C. V. Nass, vice president, Beardsley & Piper Division, Pettibone Mulliken Corp., Chicago, and president of the association, presided. In his opening talk, he discussed the changes that have taken place in the general business picture since the meeting a year ago. He pointed out that government activity and controls are declining as defense production levels out. The need for better merchandising was stressed. Mr. Nass indicated that foundry equipment manufacturers should give greater attention to research, to eye appeal of machines, and to the replacement of obsolete equipment in foundries with modern designs capable of increasing production and decreasing costs.

J. W. Devine, vice president, Consultants for Management Inc., Pittsburgh, in talking on "A Sound Approach to Renegotiation," indicated this country may have a war-time economy for some time to come. Mr. Devine outlined features of the 1951 act and then explained what individual companies should do to meet renegotiation problems. These included: Train personnel to handle renegotiation; select people that are objective; plan segregation of defense sales; establish sound production and cost control; get acquainted with and make use of aids and helps provided by government; develop sound financial policies and do not get careless because loose handling of finances will cause trouble; prepare the case on the basis of facts and logic.

I. R. Wagner, president, American Foundrymen's Society, stated that the foundry industry greatly appreciates the contributions to progress which FEMA members have made. Development of new machines and equipment takes loads off of human beings and puts them on mechanical devices where they belong. Mr. Wagner reported on the safety and hygiene program of the AFS and stated a steering committee has worked out a program which should be of great value to foundrymen. He urged active interest in the work of the various committees which have been appointed.

W. W. Maloney, secretary-treasurer of AFS, thanked the FEMA for the co-operation given to the society. A. A. Hilbron, convention and exhibits manager, AFS, expressed appreciation for the co-operation of equipment manufacturers in staging the fine show at Atlantic City last May. He also reported on a study made following the show to secure comments on certain phases of that activity. The data collected will be of value in staging the next foundry show, which Mr. Hilbron announced will be held in Cleveland, May 8 to 14, 1954.

Arthur J. Tuscany, executive secretary-treasurer of the association, urged the members to give much greater attention to planning future sales programs. If the industry is to continue at a satisfactory rate after defense production levels off, factors of improvements in design and intelligent merchandising of product must be given first consideration. Mr. Tuscany also reported the finances of the association in good condition.

E. A. Borch, vice president and general manager, National Metal Abrasive Co., Cleveland, and chairman of the Statistical Committee, presented an interesting analysis of FEMA business trend reports. This interpretation indicated that the curve of business activity during the Korean defense activity followed closely the trend during World War II.

Thomas Kaveny Jr., president, Herman Pneumatic Machine Co., Pittsburgh, outlined the present situation with regard to NPA and OPS contracts. George Fisher, chief, Foundry Equipment and Supplies Section, NPA, answered questions concerning probable future trends in allocation of materials. Norman C. Parkin, chief, Machine Tool Branch, Materials and Manufactured Goods Division, OPS, Washington, outlined the present regulations applying to the foundry equipment industry. He gave little hope for early decontrol of prices on machinery.

Frank G. Steinebach, FOUNDRY, Cleveland, pointed to the unfair treatment that producers of castings are

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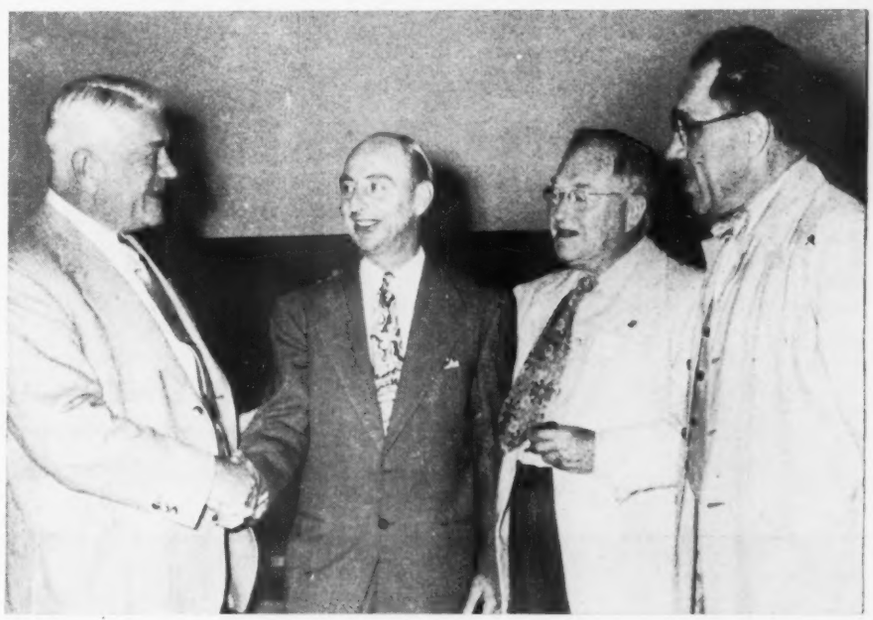

New FEMA president, Claude B. Schneible (left), receives congratulations from C. V. Nass, immediate past president. At their left are W. B. Wallis, new vice president, and Arthur J. Tuscany, executive secretary-treasurer

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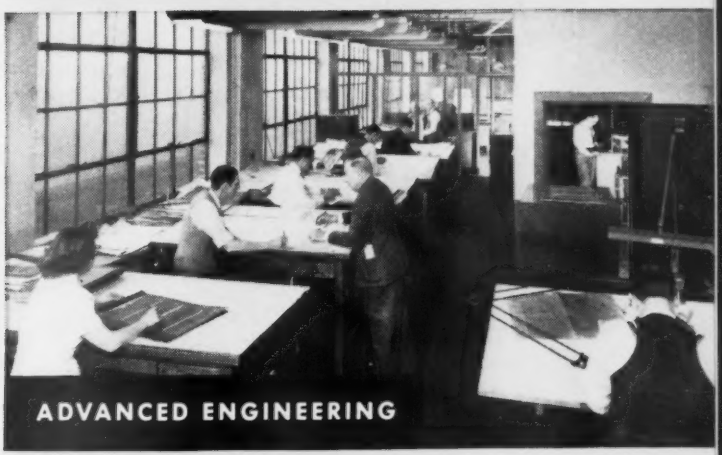
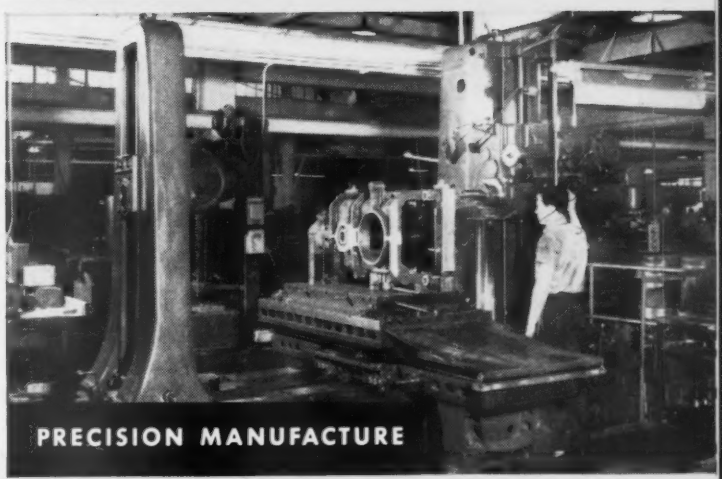
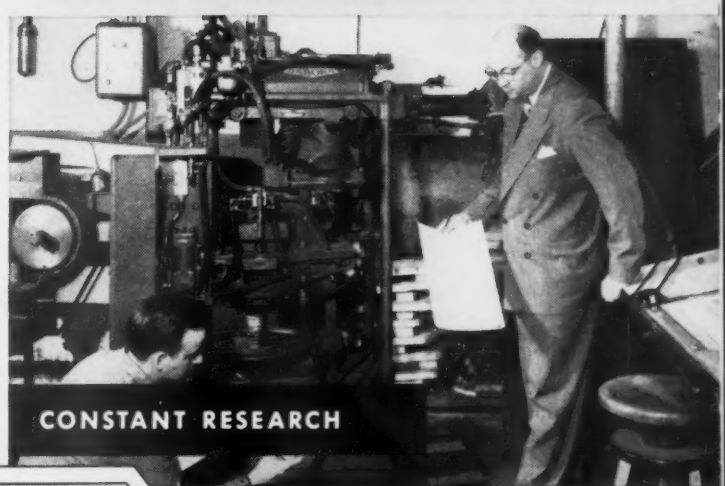


ADVANCED ENGINEERING



PRECISION MANUFACTURE



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FOUNDRY EQUIPMENT MEMBER FEMA MANUFACTURERS ASSOCIATION INC.

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(*Concluded from page* 157)
receiving at the hands of OPS. He stated that present conditions of supply, and the existence of strong competition eliminates any need for control of prices. He indicated the future outlook for increased business in the foundry industry is bright.

Wayne Belden, executive vice president, Ajax Flexible Coupling Co., Westfield, N. Y., gave an interesting talk on the value his company derives from a number of trade associations, including the FEMA.

H. E. Helling Jr., advertising manager, Mathews Conveyer Co., Ellwood City Pa., and chairman of the public relations committee, indicated the importance of greater use by members of the FEMA trademark. A. J. Grindle, president, Grindle Corp., Markham, Ill., and chairman of the membership committee, reported that three firms had joined the association during the year. Mr. Grindle also reported on the activities of the National Castings Council last year.

Announcement was made that the next annual meeting of the association would be held at the Greenbrier, White Sulphur Springs, W. Va., Oct. 15-17, 1953.

An enjoyable feature of the annual dinner was the presentation of Awards of Service certificates to the past presidents of the society. Those present included Verne E. Minich, chairman of the board, American Wheelabrator & Equipment Corp., and the first president of the association; Robert S. Hammond, Whiting Corp.; Herbert S. Hersey, C. O. Bartlett & Snow Co.; P. J. Potter, Pangborn Corp.; Thomas Kaveny Jr., Herman Pneumatic Machine Co.; Otto A. Pfaff, American Wheelabrator & Equipment Corp.; and Chester V. Nass, Beardsley & Piper Division.

NEW ENGLAND FOUNDRYMEN MEET

In 12th Annual Regional Conference

By EDWIN BREMER
Metallurgical Editor
FOUNDRY

FOUNDRYMEN in the New England area turned out in good force at the 12th New England Regional Foundry Conference held at Massachusetts Institute of Technology, Cambridge, Mass., Oct. 24-25. Registration list showed over 600 at the meeting, which was sponsored by the New England Foundrymen's Association, Massachusetts Institute of Technology, Connecticut Foundrymen's Association, Connecticut Non-Ferrous Foundrymen's Association, Pine State Foundrymen's Association Inc., American Foundrymen's Society and its MIT Student Chapter, and Non-Ferrous Founders' Society.

Chairman of the conference was Robert C. Walker, Whitin Machine Works, Whitinsville, Mass., and in the absence of Admiral C. L. Cochrane, dean of engineering, MIT, Prof. Howard F. Taylor welcomed those present. The group then broke up to attend two simultaneous sessions on ferrous and nonferrous practice.

The ferrous session was under the direction of Clyde Armstrong, Warren Pipe Co. of Massachusetts, Everett, Mass., and Ahti Erkkinen, Builders Iron Foundry, Providence, R. I. Charles K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala., was the speaker. In discussing the melting of nodular graphite iron in the basic cupola, he pointed out that about 11 elements have the property of forming in greater or lesser degree, spheroidal graphite in cast iron, but at present magnesium is preferred since excellent results are obtained. The basic cupola is ideal for producing such iron since its ability to maintain low sulphur content permits reduction of the amount of magnesium required.

Mr. Donoho mentioned that while costs of refractories for basic-lined cupolas are higher than for acid-lined cupolas, the difference has been narrowed considerably, and that good results have been obtained with ground dolomite applied with a compressed air gun. That material costs about $1.68 per ton compared with $1.10 per ton for blown ganister in acid-lined cupolas. Use of calcium carbide in the basic cupola charges permits higher basicity in the slag, higher metal temperature, greater desulphurization and carbon pickup.

At the nonferrous session Bernard Ames, New York Naval Shipyard, Brooklyn, N. Y., spoke on shell molding. Chairmen of the meeting were Frank G. Volpe, Somerville Machine & Foundry Co., Somerville, Mass., and Oscar Swangren, Dorchester Brass & Aluminum Co., Hyde Park, Mass. Mr. Ames pointed out that not all casting designs are suited to shell molding. Tooling costs are relatively high, hence, reasonable volume of work is a requirement. Casting design must be such that suitable parting and gating can be arranged. Probably the most important factor is how much can be saved in the cleaning and machine shop departments.

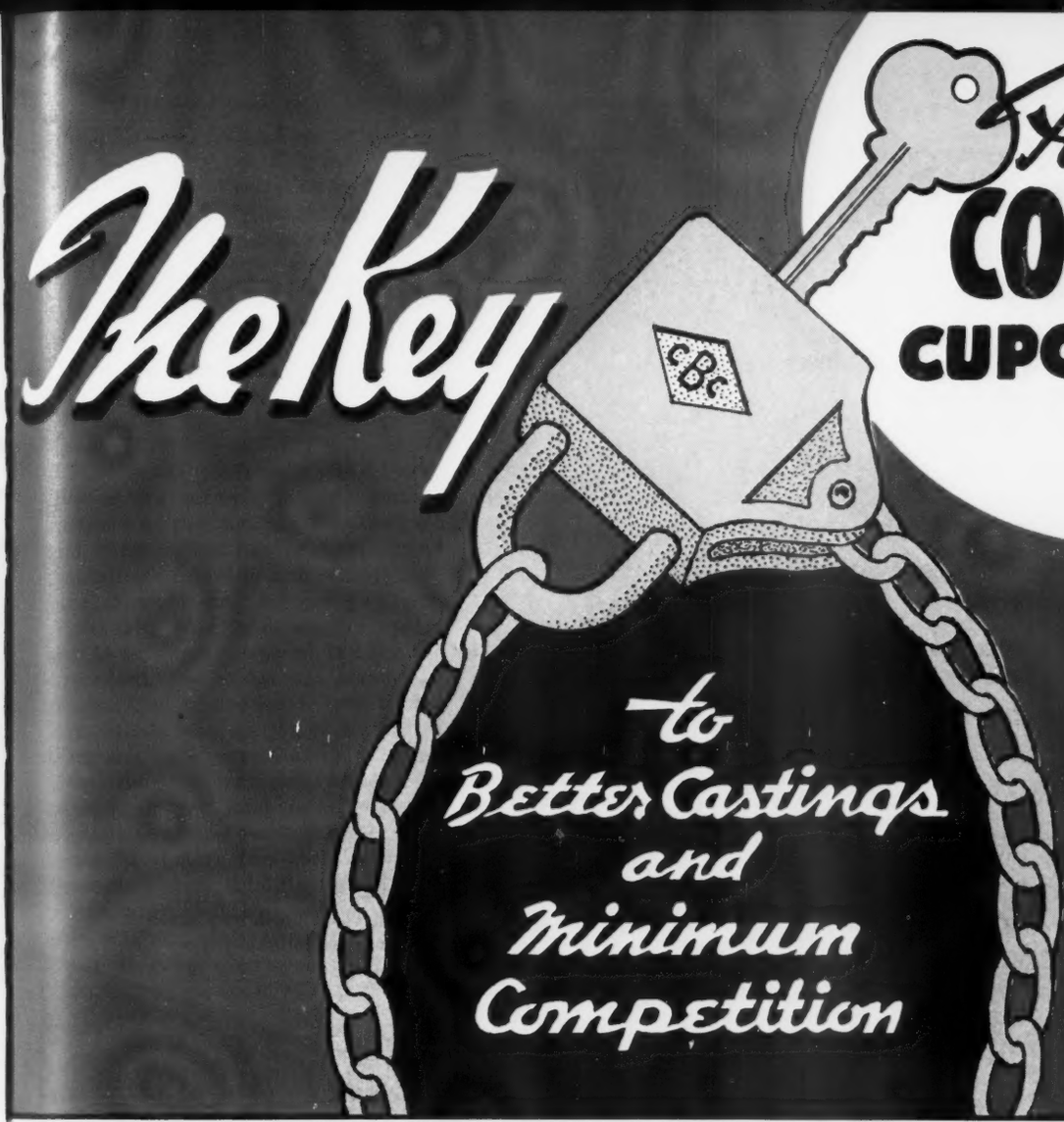
In the afternoon William Rose, Borden Co., New York, also spoke on shell molding at a session over

(*Continued on page* 163)

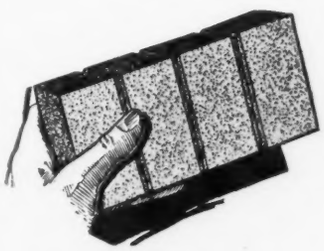
From left to right—Herbert H. Klein, Klein-Farris Inc., Boston; R. C. Walker, Whitin Machine Works, Whitinsville, Mass., and Harry Impey of Boston. Back row, left to right—Henry Frechett, Fitchburg Foundry, Fitchburg, Mass., and C. A. Wyatt, Debevoise-Anderson Co., Boston

The Key to Better Castings and Minimum Competition

Famous CORNELL CUPOLA FLUX



FAMOUS CORNELL CUPOLA FLUX CLEANSES MOLTEN IRON SO THAT YOU POUR SOUNDER, CLEANER CASTINGS AND AVOID DELAYS IN SHIPMENT AND ADDED COST DUE TO REJECTS AND MAKE-OVERS



SCORED BRICK FORM

(Approx. 4 pound brick)

A product that is used day after day, for years, in gray iron foundries and malleable foundries with cupolas, *MUST* be a profitable investment.

It pays to use Famous Cornell Cupola Flux because it removes impurities from molten iron, makes it hotter and more fluid, greatly reduces sulphur, keeps slag fluid.

***A great improvement in cupola operation* is another outstanding advantage in using this flux. There is an amazing saving in maintenance time and labor. Drops are cleaner. Bridging over is practically eliminated, and life of cupola lining is prolonged due to a glazed or vitrified surface which is formed on brick or stone.**

Famous Cornell Cupola Flux is made in *pre-measured SCORED BRICK form* to facilitate fluxing operation and avoid waste.

WRITE FOR BULLETIN NO. 46-B

The Cleveland Flux Co.

1026-1040 MAIN AVENUE, N. W., CLEVELAND 13, OHIO

Manufacturers of Iron, Semi-Steel, Malleable, Brass, Bronze, Aluminum and Ladle Fluxes – Since 1918

FAMOUS CORNELL FLUXES

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BRASS FLUX

FAMOUS CORNELL BRASS FLUX cleanses molten brass, even when the dirtiest brass turnings or sweepings are used. You pour clean, strong castings which withstand high pressure tests and take a beautiful finish. The use of this flux saves considerable tin and other metals, and keeps crucible and furnace linings cleaner, adds to lining life and reduces maintenance.

ALUMINUM FLUX

FAMOUS CORNELL ALUMINUM FLUX cleanses molten aluminum so that you pour clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections can be poured. Castings take a higher polish. Exclusive formula reduces obnoxious gases, improves working conditions. Dross contains no metal after this flux is used.

Why see U. S. Rubber when you need to grind castings?

Using U. S. Royalite® grinding wheels to finish iron gear housings for railroad parts.

A railroad brake head gets a good smoothing over from time-saving, money-saving U.S. Royalite wheel.

Because . . . for 89 years, "U.S." engineers have worked with all branches of mechanical industry to develop the most efficient and economical grinding wheel for a specific job. These experts in bonds and abrasives will be glad to consult with you at any time, whatever your grinding wheel problem. They will recommend—and when necessary design—the *right* wheel for the *right* job. Write to address below.

PRODUCT OF U.S.RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

(*Continued from page* 160)

which Earl W. Jahns, Production Pattern & Foundry Co., Chicopee, Mass., and William F. Fracis, Draper Corp., Hopedale, Mass., presided. He indicated that the process offers precision casting, reduces sand handling, and permits use of unskilled and female labor. Shell molding is applicable to production of aluminum and copper-base alloys; cast iron, nodular iron and stainless steel. Castings weighing over 200 lb are being produced.

Fine sands, preferably spread over five or six screens, provide smooth surfaces on the castings. Smaller gate and runner sizes can be used due to insulating properties and smooth surface of mold, and bottom gating is preferable. For best results molds should be cured properly. If they are overcured, the molds are weak and friable. Undercured molds tend to distort. Molds may be joined by use of bolts and nuts, wire clamps or adhesives. Backing material, which may be shot or dry sand, is only needed where size of the casting is such that it might distort the shell or break through before solidification occurs.

Following that session F. Alexander Magoun, Jaffrey, N. H., gave an interesting discussion on "These Mortals" which dealt with human relations in industry. Chairmen were A. J. Cassista, Rollstone Foundry Inc., Fitchburg, Mass., and Alexander Beck, Whitman Foundry Inc., Whitman, Mass. In this field essential attributes are keen observation with ability to understand people and their emotions. Important factor in dealing with human relation problems is the faculty of establishing the feeling of trust and confidence between management and labor. Mr. Magoun stated that interest in and knowledge of the personal lives of employees often are requirements for settling some problems.

Conference dinner was held Friday evening at the MIT Faculty Club, with Prof. Howard F. Taylor and Thomas I. Curtin Jr., Waltham Foundry Co., Waltham, Mass., presiding. Speaker was Ollie Rodman, associate editor, *Hunting and Fishing*.

Four sessions were held on Saturday. In one under the direction of Leroy M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I., and Carl Erickson, Franklin Foundry Co. Inc., Hyde Park, Mass., the speaker was H. W. Dietert, Harry W. Dietert Co., Detroit. He discussed foundry core practice and stated that it consisted in maintaining proper control of six properties—structural characteristics desired, green strength, air setting quality, and dry, hot and retained strengths.

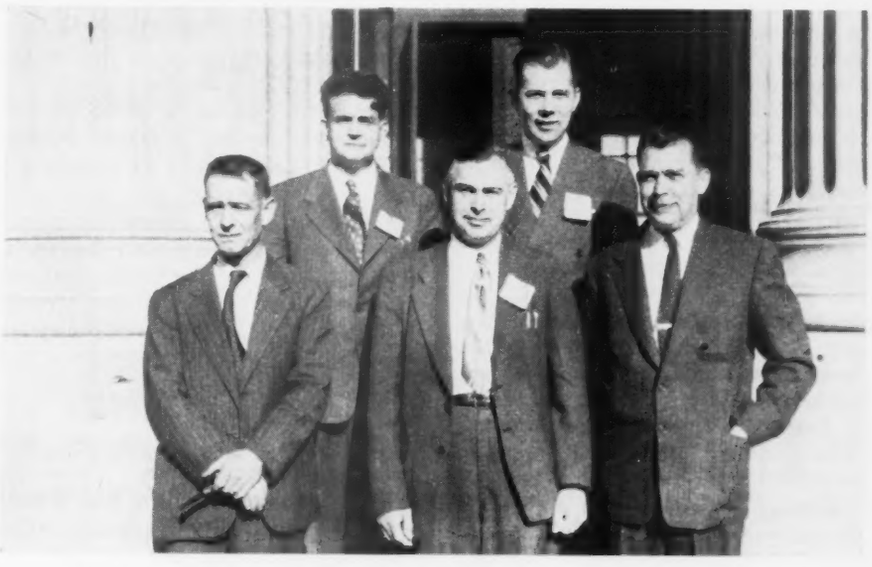
Left to right—Gordon L. Paul, Brown & Sharpe Mfg. Co., Providence, R. I., and Frank R. Elliott, Westinghouse Electric Corp., Springfield, Mass.

Structural characteristics may be controlled by sand grain type, shape and size and by use of binders and additives. Green compression strength involves such phases as ability to stand up, roll out of the box without sticking, distortion or breaking, maintenance of overhanging projections, and resistance to sagging. Use of small amounts of bentonite in the core mix, around 0.3 per cent, will have a beneficial effect on those properties except resistance to sagging.

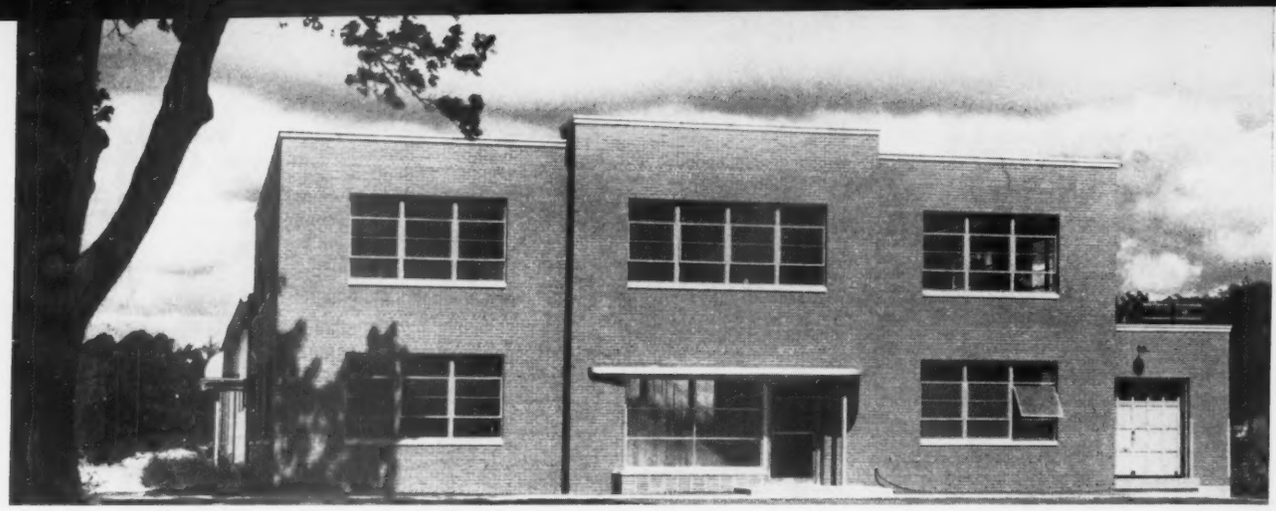
Following that meeting two simultaneous sessions on ferrous and nonferrous subjects were held. That on nonferrous was chairmanned by Ely Portman, White-Stillman Foundry Co., Providence, R. I., and Robert Sheldon, Springfield Bronze & Aluminum Co., Springfield, Mass., and those in attendance saw the motion picture "Effect of Gating on Casting Quality" prepared by the American Foundrymen's Society.

Meeting on cupola operation took the form of a panel discussion, with Joseph B. Stazinski, General Electric Co., Everett, Mass., as chairman. Members of the panel in addition to the chairman included Stanley H. Bullard, Bullard Co., Bridgeport, Conn.; August Bouldry, Whitman Foundry Co., Whitman, Mass.; William Olsen, Draper Corp., Hopedale, Mass., and Walter M. Saunders, Providence, R. I. Subject was introduced by Mr. Saunders who briefly described the various steps involved in placing a 45-in. cupola in operation. Then the audience asked numerous questions on blast pressures and volumes, coke and coke to iron ratios, slag control, etc. One interesting feature was replies from the audience relative to operating characteristics of similar size cupolas which showed a wide variation in tuyere areas, coke splits, melting rates, etc.

Afternoon session on naturally bonded molding sands was under the direction of Albert M. Nutter, E. L. LeBaron Foundry Co., Brockton, Mass., and John V. Dahlberg, Kidder Press Co. Inc., Dover, N. H., with Clyde Sanders, American Colloid Co., Chicago, as speaker. He pointed out that most successful results are obtained with natural molding sands only when suitable equipment is available for conditioning, careful control is exercised, and adequate supervision is provided in preparation and in use. Under such conditions it is possible to maintain consistent and uniform results by making suitable adjustments in binder, moisture, and addi-



Excellent weather prevailed during the New England Conference, and here some speakers and committee men are getting a little sunshine before proceeding with participation in the sessions



Michigan Steel Opens New Plant

THE Whitehall Precision Casting Division of Michigan Steel Casting Co. opened its new foundry at Whitehall, Mich., Sept. 29, with an openhouse for its customers and suppliers. Families of employees and citizens of the community were entertained at the plant on Sept. 26 and 27.

The new plant provides the latest developments in equipment and plant facilities in the precision casting field. Special attention has been given to permit straight line production from the making of the wax pattern to the finishing operations.

Facilities have been provided to control all of the various operations. All furnace charges are made up in the laboratory, and equipment is provided to permit metallurgical, chemical, zyglo and x-ray inspection.

A view of the front of the plant, which houses the offices and engineering department is shown above. The side entrance on inspection day is shown at the lower left, and a jet engine displayed during the family open house is shown at the lower right.

tives such as seacoal, wood flour, etc.

Mr. Sanders also drew attention to the advisability in sand testing and control to determine the properties of mold hardness, green compression, density and green permeability by making standard 2 x 2-in. specimens which are rammed from one to ten times. Changes in those properties indicate what can be expected in use since in molding the ramming conditions vary in different areas. Also the properties mentioned should be considered together and not individually. A good sand, according to Mr. Sanders, should show, with increasing number of rams a gradual increase in hardness, green compression, and density and a gradual decrease in permeability.

A large crowd attended the annual "Foundrymen's Smoker" on Saturday night. This event is one of the features of the regional foundry conference and is arranged by the various foundry supply houses.

Gray Iron Founders Meet

(*Continued from page* 134)

and return it promptly so that a decision on prices can be expedited.

President Edward L. Roth presided at the opening business session at which the past year's work of various committees was reviewed. He commended the committee members and the society staff for their contributions to the organization's progress. Henry J. Trenkamp, treasurer, reported on the sound financial condition of the society.

Donald H. Workman, executive vice president, discused briefly the high lights of the year's activities, including developments connected with the defense program and Washington agencies. He pointed out that production of gray iron castings increased from 135 pounds per capita in 1943 to 195 pounds in 1951 and that future gains may be expected with growth in population. Another barometer is provided by the expansion in steelmaking capacity, since gray iron shipments have consistently averaged about 400 pounds per ton of steel produced.

Charles O. Burgess, technical director of the society, discussed steps being taken in carrying out various objectives established for the technical department. Among these objectives are:

Publication of manuals for engineers and designers to describe uses of gray iron; development of new gray iron applications; co-operation with technical and engineering societies, government and other engineering specifying bodies for metal use; preparation of articles and talks for presentation before technical groups; consultation with member companies on technical problems and acquainting them with new produc-

(*Continued on page* 167)

Seasons Greetings
made with brick!

● Those bells that ring out Yule . . . the electric train under the tree . . . the piles and piles of packages—most everything we enjoy at Christmas owes its origin, in part, to *refractory* brick.

● Without refractory brick to line the furnaces of industry there would be no heat, light or power, no paper, no metal, no manufacturing, no transportation.

● Next to agriculture, there is no more vital contribution to the economy of our nation than such heat-resisting refractories products as those made by Grefco. From Grefco mines and plants—here and overseas—General Refractories Company is supplying brick, mortars, plastics and castables to serve our nation in times of peace and in times of problem.

● At this time of year let us hope it will be peace. But whatever problem we must face, let's make sure American men and American industry are ready to measure up!

General Refractories Company

PHILADELPHIA

AIR CLEANING PROBLEM?

This bulletin has the answer — write for your FREE copy!

Buffalo units include:

- "DC" STATIC AIR WASHERS
- HYDRO-VOLUTE SCRUBBERS
- WET GLASS CELL AIR WASHERS
- CUPOLA WASHERS
- GAS SCRUBBERS
- HYDRAULIC SCRUBBING TOWERS

Whatever your problem — dust, smoke nuisance, air pollution — "Buffalo" builds the unit to handle it effectively. "Buffalo" experience in washing air goes back to the turn of the century, and many of the original "Buffalo" units are still in operation. This experience has enabled us to develop the most efficient, compact, and easy-to-maintain units for every air cleaning problem.

For the most satisfactory and economical solution to your dust, fume or smoke problem, write now for Bulletin 3181-B.

BIG BATH FOR AIR!

A large "Buffalo" Static Air Washer keeping the air in a foundry clean.

DIAMOND JUBILEE 75TH ANNIVERSARY

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221 MORTIMER ST. BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

VENTILATING | PRESSURE BLOWING AIR CLEANING | COOLING AIR TEMPERING | HEATING INDUCED DRAFT | FORCED DRAFT EXHAUSTING

(*Continued from page* 164)

tion methods; and improved research in production methods.

E. H. Thompson, the H. P. Deuscher Co., Hamilton, O., reported for the Advertising Committee on its program of advertising in various publications. The committee is considering a direct mail program to be directed to gray iron consumers.

Reporting on work of the Cost Committee and its 18 local cost groups, Chairman A. E. Hageboeck Frank Foundries Corp., Moline, Ill., said that the society's Cost Manual No. 2 is nearing completion. This manual, intended to incorporate cost procedures for improved methods of making castings, is expected to be issued next spring.

Hermann P. Good, Textile Machine Works, Reading, Pa., chairman of the Handbook Committee, said that more than 9000 copies of manuals eventually to be incorporated in the handbook have been distributed.

The Safety Committee is gathering data for a safety manual for management, it was reported by Chairman Frank O'Malley, Ferro Machine & Foundry Inc., Cleveland. Over 50,000 copies of the committee's safety booklet have been distributed.

To Request Higher Prices

C. R. Culling, Carondelet Foundry Co., St. Louis, reported for both the Statistical Committee, of which he is chairman, and the Gray Iron Industry Advisory Committee to OPS. He discussed results of the latter's meetings with OPS and the decision to measure the industry's earnings standard as a basis for action on the request for higher prices on castings.

A proposal by the Technical Committee, as reported by Max Kuniansky Lynchburg Foundry Co., Lynchburg, Va., is for Technical Director Burgess to go to England to observe operations of the British Cast Iron Research Association as a preliminary to consideration of establishing research programs in this country.

The society's established terms and conditions of sale have become more generally recognized by buyers and sellers, and additional helpful information may be distributed in the near future, it was reported by Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O., committee chairman.

Reporting on the National Castings Council, Edward L. Roth said that group had been helpful in giving

"Certified" Abrasives

CLEAN MORE CASTINGS PER DAY!

SPEED UP production in *your* blast cleaning room with "Certified" Abrasives. "Certified" Samson Shot and Angular Grit are first choice in hundreds of foundries...give better, longer performance because they're made *extra-tough* by a special *automatically controlled* hardening process. Specify "Certified" and start cleaning more castings per day.

All sizes graded to S.A.E. specifications

Experienced Foundrymen say:

Always specify "Certified"

ACCEPTED AND USED FOR OVER 55 YEARS

PITTSBURGH CRUSHED STEEL CO., Pittsburgh, Pa.

STEEL SHOT AND GRIT CO., Boston, Mass.

MEMBER FEMA

FOUNDRYMEN PLAN TRIP TO 1953 PARIS INTERNATIONAL

SEVERAL hundred American foundrymen executives and their wives are planning to visit Europe in the fall of 1953 to attend the International Foundry Congress in Paris. The trips are being sponsored by the American Foundrymen's Society as a development of the 1952 International held in Atlantic City last May and attended by nearly 300 foundrymen from abroad.

The society reports that over 300 registrations have already been received, with the event still a year away. As a result, the original two tours planned are now being extended to four tours, each limited to a total of approximately 100 persons. The tours will be operated on an all-expense basis with all travel and accommodations arranged by the Exprinter Travel Service, the American branch of the French organization, Havas-Exprinter, an old established international travel and tour agency.

While the main party on each tour will travel to and from Europe by steamship, it is expected that many others will use the transoceanic airlines. The first tour party is scheduled to sail from New York Aug. 18, the last on Sept. 13, all sailing dates dependent on schedules of the steamship lines. It is known now that the first tour will sail eastbound on the *S. S. Caronia*, returning on the *RMS Mauretania*.

Each tour is being scheduled for approximately five weeks in Europe, including at least a week at the International Foundry Congress in Paris, Sept. 19-26. In addition to France, the foundrymen will visit England, Belgium, Holland, Germany, Switzerland and Italy, and in each country arrangements will be made with members of the International Committee of Foundry Technical Associations for plant visitations.

The Association Technique de Fonderie de France under the leadership of M. Paul Muguet, is preparing a full program of events for the Congress week beginning with registration Sept. 19. Many technical papers will be presented and special breakfasts, dinners, plant visitation trips and sightseeing excursions, with special programs for the ladies, will be offered.

The American party will be headed by past AFS President and International Vice President L. N. Shannon, vice president, Stockham Valves & Fittings Inc., Birmingham, who becomes the international president in January, 1953. In that capacity Mr. Shannon will preside at all meetings of the International Committee in Paris.

The "official party" will also inclinclude AFS President I. R. Wagner and Mrs. Wagner, AFS Vice President Collins L. Carter and Mrs. Carter, and immediate Past President Walter L. Seelbach and Mrs. Seelbach. It is expected that each of the members of the National Castings Council will be officially represented, as they were at the 1952 International Congress in Atlantic City.

While actual tour costs have not yet been determined, awaiting sailing schedules, the society has announced an approximate all-inclusive cost of between $1800 and $1900 per person. This will include first-class hotel and steamship accommodations in both directions, all transportation on the European itineraries, baggage and personal transfers and a majority of meals on the entire trip. All foundry executives interested in the trips should register with the American Foundrymen's Society, 616 S. Michigan Ave., Chicago 5, as soon as possible to permit early booking of steamship and hotel accommodations.

Washington defense agencies a better understanding of the foundry industry's problems.

Walter L. Seelbach, Superior Foundry Inc., Cleveland, reported that the industry's advisory committee to NPA, of which he is a member, has recommended the committee be maintained, rather than be disbanded as was suggested.

John M. Price, chairman of the Foundry Educational Foundation, stated that approximately $750,000 has been raised for the organization's work since its inception, and that a yearly operating budget of $120,000 to $130,000 has been established. He urged continued active support of the foundation

Mr. Price's remarks were supplemented by George K. Dreher, FEF executive director. The latter made a slide film presentation showing accomplishments of the foundation in establishing courses of foundry instruction at universities which are developing both engineers for the foundry industry and graduates with a better understanding of casting applications.

Winners of the society's annual redesign contest were announced by President Roth at the concluding luncheon. Checks of $100 each went to these individuals: A. C. Hauser, director of engineering and sales, American Hydrovac, Division of Pitz Foundry Inc., Brooklyn, N. Y. for redesign of a unit cast boiler feed pump; Alfred J. Schmidbauer, production manager, Iroquois Foundry Co., Racine, Wis., for redesign of a gear box for a power-driven saw; George K. Green, Textile Machine Works, Reading, Pa., for redesigning a textile machine part; W. F. Geppert, president, Acme Foundry Inc., Tacoma, Wash., for redesign of a cable drum; Frederick Waters, foundry superintendent, Seneca Falls Machine Co., Seneca Falls, N. Y., for redesign of a lathe base.

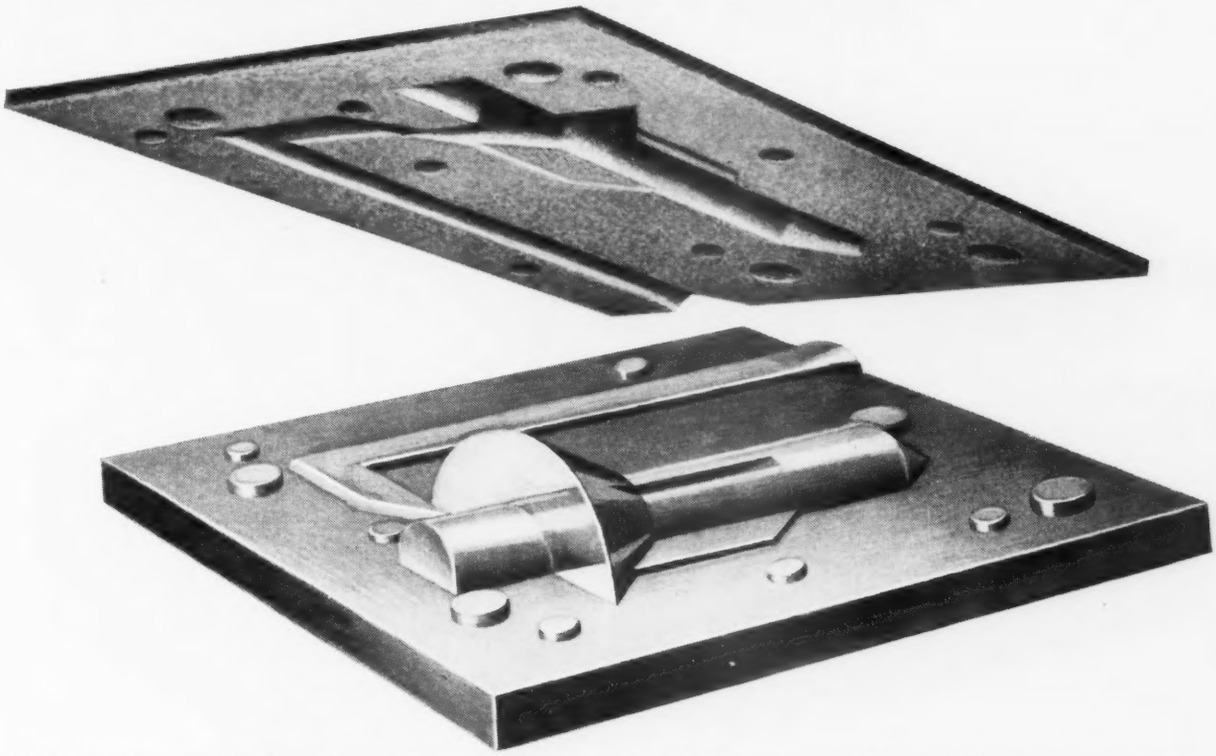
These awards were based on redesign of parts formerly made by other forms of fabrication to production as a gray iron casting.

Carl Taylor, president Waukesha State Bank, Waukesha, Wis., gave an inspirational talk, entitled "America Tomorrow," during the Thursday luncheon. Tracing the trend in this country toward universal government controls, with an attending loss of individual liberties, he posed the question of whether we want to reverse or further this trend.

GET CLOSER TOLERANCES

WITH SHELL MOLDING–

AND USE NEW G-E SHELL RESINS!



Molding by the shell method? General Electric phenolic resins, specially formulated for this new process, can help you realize the remarkable benefits it provides. Tolerances as close as .002 to .005 inches per inch are being achieved with shell molding. Castings—so clean and accurate that costly machining can be practically eliminated—are being produced.

Commercial tests at leading foundries show that the new G-E resins form strong, dimensionally accurate shells with smooth surfaces, sharp contours, and high gas permeability that help you get maximum results from the new shell process.

If you are using shell molding, or if you are thinking about using it, you'll want to investigate these new General Electric shell resins. General Electric has prepared an informative brochure telling what the new shell process can mean to you in terms of simplified molding techniques and substantial savings in metal, sand and labor. For a copy, just mail the coupon below. There's no obligation, of course.

SEND COUPON TODAY FOR MORE DETAILS

You can put your confidence in—

GENERAL ELECTRIC

General Electric Company
Section 126-4A, Chemical Division
Pittsfield, Massachusetts

Please send me a free copy of "G-E Phenolic Resins for Shell Molding Process." Include information on:

- ☐ G-E Phenolic Resin Core Binder 12353
- ☐ G-E Permafil 3255 for impregnating porous castings

Name_____

Firm_____

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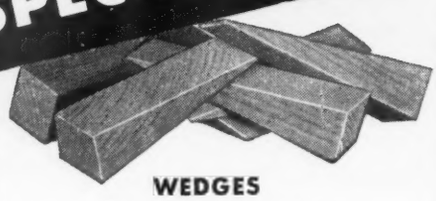
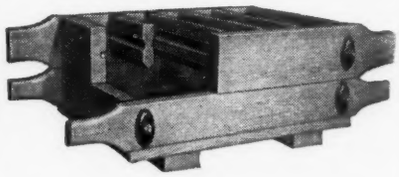
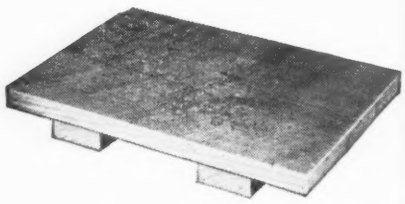
CMD FOUNDRY SPECIALTIES



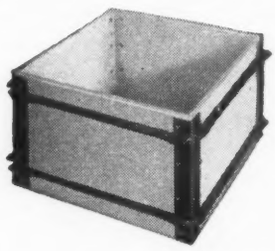
WEDGES
Hard or soft wood



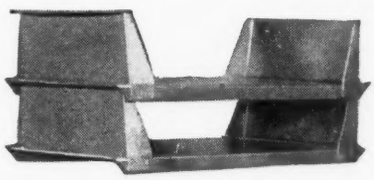
CMD WOOD FLOOR FLASKS
All sizes and shapes



CMD WOOD BOTTOM BOARDS
All sizes and shapes



CMD NON-WARP, NON-BURN SLIP JACKETS



CMD DUAL-PURPOSE CORE TRAYS

CMD TYPE F CHIPPING HAMMER
Metal handle. Head has 2 chisels at right angles

CMD TYPE A CHIPPING HAMMER
Combination drift and chisel

CMD TYPE C CHIPPING HAMMER
For general hand chipping

TEXTITE AIR SEPARATOR
Cools, cleans and dries the air in one operation. *No moving parts.* Saves air tools. Nothing to replace.

CMD PNEUMATIC CORE BARROWS
With single wheel or two wheels. (as shown here)

CMD PNEUMATIC CORE TRUCKS
Minimize core chafing and breakage

WRITE FOR BULLETINS
On CMD core-conveying equipment and other foundry specialties—preferred by experienced foundrymen for 25 years.

CHICAGO MANUFACTURING & DISTRIBUTING COMPANY

1928 WEST 46th STREET CHICAGO 9, ILLINOIS

Industry BRIEFS

WORTHINGTON CORP., Harrison, N. J., is installing an electric arc furnace and a new charging system in its Harrison steel foundry. The 2-ton per hour capacity furnace will replace a cupola and converter setup. It is expected to be in operation by January, 1953.

* * *

American Steel Foundries, Granite City, Ill., has instituted a series of programs designed to improve working conditions at its plant. The work to be done includes an extension to the cleaning and finishing building, mechanization of several facilities and other changes.

* * *

DeBothezat Fans Division, American Machine & Metals Inc., East Moline, Ill., will be represented in the greater New York and northern New Jersey areas by Air, Dust & Fume Control Co., 50 Church St., New York and Broad St., Newark, N. J.

* * *

General Steel Castings Co., Granite City, Ill., is continuing its multimillion postwar expansion and improvement program with the erection of a 100 x 700 ft annex to its finishing department building and a 200-car addition to parking lot facilities.

* * *

Dow Chemical Co. Midland, Mich., inaugurated a policy on Nov. 1 of shipping all magnesium alloy ingot from its plants in palletized form. Palletizing is said to facilitate mechanical handling and the separation of batches in shipping and unloading.

* * *

Holt Equipment, Salem Rd., Independence, Oreg., was destroyed Sept. 16 by a fire which caused a loss of $75,000. Both the old foundry building and a new building nearing completion were destroyed.

* * *

Newcomb-Detroit Co., 5741 Russell, Detroit, has acquired Windsor Metal Fabricators Ltd., Windsor, Ont. The new subsidiary will be called Newcomb Industries Ltd. and will manufacture industrial ovens, spray booths, parts washers and dust collectors and will do general metal fabricating work at a new location on London St. in Windsor. David H. Baird, sales executive in Newcomb-Detroit, is vice president in charge of sales for the subsidiary, and Clinton W. Vickerman, manager of the old firm, is plant superintendent.

* * *

Cerium Metals Corp., 153 Waverly Place New York, has appointed Ohio Ferro-Alloys Corp., Canton, O., as its exclusive sales representative to the iron and steel industry. The cerium products, which will supplement the complete line of ferro-alloy products manufactured by Ohio Ferro-Alloys Corp., will include mischmetal, cerium and rare earth alloys and cerium master alloys containing aluminum, magnesium, manganese, silicon and other elements.

* * *

Hanna Engineering Works, 1765 Elston Ave., Chicago 11, has appointed Haldeman-Langford, 2580 University Ave., St. Paul 4, and Scott Equipment & Engineering Co., 54 West 30th St., Indianapolis 8, to be sales representatives in Minnesota and northwestern Wisconsin and in central and southern Indiana and northern Kentucky, respectively. Hanna manufactures air and hydraulic cylinders and control valves.

* * *

Buckeye Steel Castings Co., 2211 Parsons Ave., Columbus, O., celebrated its 50th anniversary in October. During its 50-year history the firm has shipped over 2,280,000 tons of finished steel castings. Buckeye also recently honored 52 employees with from 25 to 50 years of service with the company.

* * *

J. K. Munhall Co., manufacturer's representative in Buffalo for the Detroit Electric Furnace Division, Kuhlman Electric Co., Bay City, Mich., has merged with Eastern Foundry Supplies Inc., 109 Frelinghuysen Ave., Newark, N. J. With offices at the Newark address, the Munhall territory becomes part of the territory of Eastern Foundry Supplies for distribution of Detroit Electric melting furnaces in New York, northern New Jersey and the New England states.

* * *

Cleco Division, Reed Roller Bit Co., Houston, Tex., has appointed Electric Tool & Supply Co., 3000 Santa Fe Ave., Los Angeles, Industrial Supplies Co., 324 North Seventh St., Steubenville, O., and Florida Aviation Corp., 4051 Northwest Twenty-fifth St., Miami 42, Fla. to distribute Cleco and Dallett air tools and accessories in their areas.

* * *

Syntron Newark Sales Co., representing Syntron Co., Homer City, Pa., has opened new headquarters in Hasbrouck Heights, N. J., at 140 Route 17 and Henry St. It will sell the entire line of equipment manufactured by Syntron Co. Syntron Power Tool Co. will rent and sell material in its field from the same address.

* * *

Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn., dedicated a $1 million addition to its Buffalo conveyor belt plant, Oct. 25. The new facilities will increase the firm's conveyor belt production capacity by 41 per cent. New equipment includes a press costing $220,000 to make belts up to 72 in. wide instead of the previous limit of 60 in.

* * *

Wisconsin Centrifugal Foundry Inc., Waukesha, Wis., has increased floor space 20 per cent, to 15,000 sq ft. Several machine tools and heat treating facilities have been added, and the offices were remodeled. Total cost was $25,000.

* * *

Gould-National Batteries Inc., 467 Calhoun, Trenton 7, N. J., has moved its northeastern area service and repair center from North Bergen, N. J., to larger quarters at 309 51st St., West New York, N. J. James E. Vaughan Jr. is manager of the new station.

* * *

Lynchburg Foundry Co., Lynchburg, Va., has instituted an $800,000 improvement program, including a sizable shell molding process operation. Most of the program involves the location of mechanized facilities in existing buildings.

* * *

Permacast Co. has equipped a 1000-sq-ft foundry building at 610 William St., Baltimore, for the production of permanent mold aluminum castings.

Herman MOLDING MACHINES

help make this foundry a good place to work

because "We do jobbing work involving a variety of types of pattern equipment. Our several Herman Molding Machines, for our largest or medium-sized work, are among the most productive in our shop.

On these Herman's we are able to change patterns readily with a minimum of lost production time.

We put every job we can on these machines for maximum production each day, for our customers are always in a hurry."

J. S. Marcinec
Superintendent Plant W
The Forest City Foundries Company
Cleveland, Ohio

This statement provides additional proof that Herman Molding Machines help this foundry, and others throughout the world, get production when and where it is needed.

Good reasons for this include Herman dependability; rugged construction; and simplicity of operation (one rotary valve handle controls the complete cycle).

The most important point to remember is that Herman Molding Machines have made their way by the way they're made.

We will welcome an opportunity to give you more details.

Herman **MOLDING MACHINES**

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH 22, PA.

This Foundry
is a good place to work
The Forest City Foundries Company
THE two foundries operated by Forest City in Cleveland, Ohio, provide ample evidence that 'a good place to work' can be achieved by coordinated effort:
(1) Its half-century production of quality gray iron castings, from one to 1,000 lbs., is backed by intelligent, sound research and close laboratory control; (2) a modern core sand-mixing and sand-delivery system long ago replaced the wheelbarrow and shovel; (3) belt, gravity-roll, apron, chain, casting, and car-type are just a few conveyors used to relieve back-breaking labor in the plants; (4) oil and gas type core ovens are on the roof, making for better working conditions.
Perhaps the most significant yardstick proving that Forest City is a good place to work is the fact that over 21% of its employees have been with the company 20 years or longer.
Herman Molding Machines contribute their share toward making this company a good place to work: They're easy and simple to operate . . . one rotary valve handle controls the complete cycle . . . Hydraulic rollover and pattern draw provides smooth operation . . .
Here at Forest City Foundries, as everywhere throughout the world, Herman Molding Machines have made their way by the way they're made.
FOUNDRY EQUIPMENT MEMBER FEMA MANUFACTURERS ASSOCIATION INC.
Herman
HERMAN PNEUMATIC MACHINE
MOLDING MACHINES
BANK BUILDING, PITTSBURGH 22, PA.

The ad reproduced herewith originally appeared in the September, 1951 issue of FOUNDRY.

THE
Buy-Law
FOR REFRACTORY PERFORMANCE

High Softening Point
High Heat Resistance
High Anti-Spalling
High Melting Point
High Volume Stability
High Anti-Slagging

Mullite is the only alumina-silica refractory stable at high temperatures . . . and for mullite the buy-law is SHAMVA®

THE MULLITE REFRACTORIES CO.
SHELTON, CONN.

Modern Slag Ladle

(*Continued from page* 111)

second section of the pattern, to form the greatest part of the dome, is adjusted in place and rammed full of sand. The third, or smallest, section of the dome pattern then is rapped down into place. This section has a shallow flat extension on the upper side to serve as a guide in setting the 12-in.-diam riser block. The mold at this stage is shown in Fig. 3.

Formation of the remainder of the outside part of the mold is accomplished in the same way described previously. Additional ring plates and circular flask sections, gradually smaller in diameter, are added and rammed full of sand until the entire pattern, including the riser block, is enclosed in sand. The riser is drawn out through the top, and the entire cope is lifted as a unit and lowered onto suitable supports where a man can work inside. He draws the loose pattern pieces, effects minor repairs if necessary, sets small cores in the brackets, nails the surface and covers it with a coating of silica wash. This part of the mold is dried by portable gas burners.

Coated with Silica Wash

After the pattern has been removed from the drag half of the mold, the core is touched up if necessary and given a coat of silica wash. This part of the mold then is placed in a large drying oven for approximately 36 hours. Then it is taken out, given another coat of silica wash and lowered into one of the casting pits, where the cope is lowered over it and the entire assembly prepared for the reception of the molten steel.

The single pouring sprue inside a stack of small round flasks extends from a flared opening at the top to a pocket in the bottom cope flask ring. In the pocket the sprue is connected to two horizontal gates, one right and one left, which deliver metal tangentially into the mold cavity. Sprue and gate passages are formed in tiles. Position, size and construction of the gates may be noted in the lower left corner of Fig. 8. Metal from a bottom-pour ladle enters the mold in a steady stream until it enters the riser. At that point the stream is shut off, the ladle is moved over and the riser cavity is filled with fresh, hot metal direct from the ladle nozzle. These cinder pot castings vary from about 10,000 lb to 50,000 lb, with a capacity for up to 500 cu ft of slag.

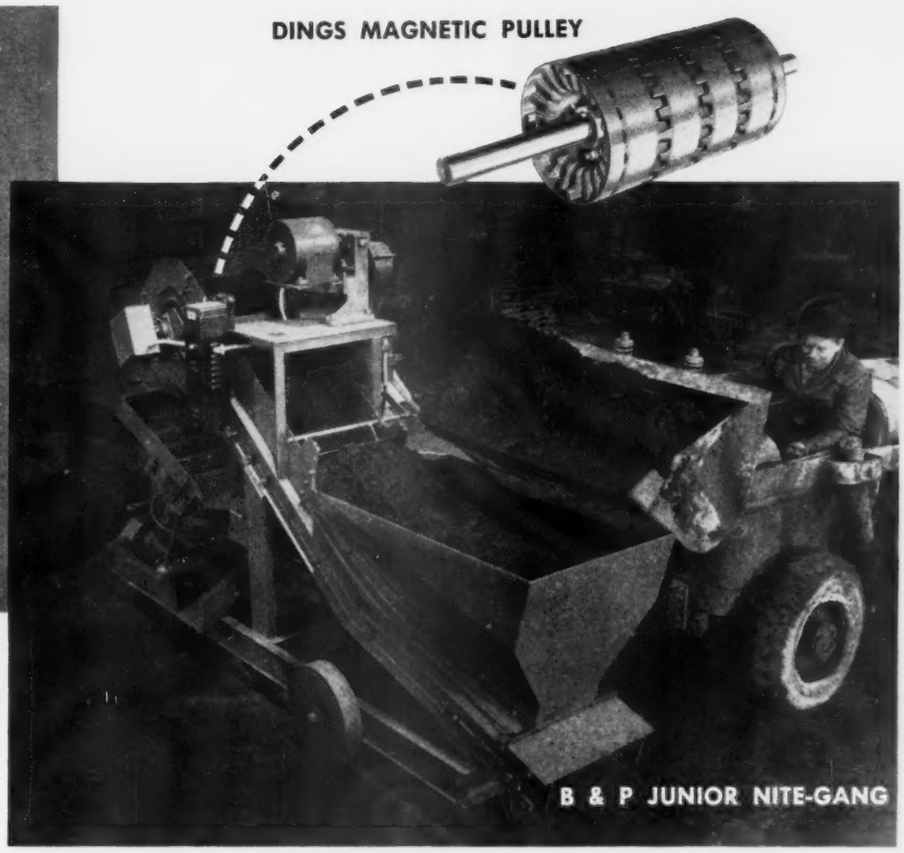
After the casting has cooled suffi-

(*Concluded on page* 177)

B&P

DINGS

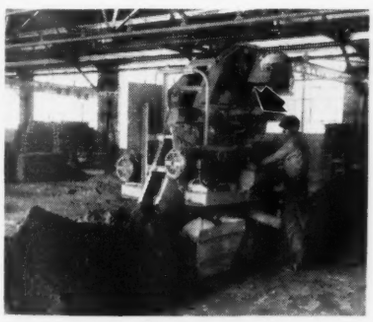
DINGS MAGNETIC PULLEY



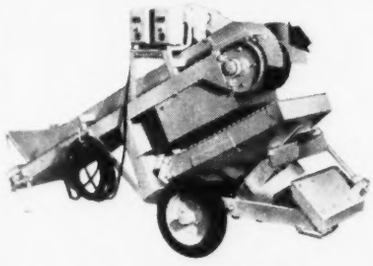
B & P JUNIOR NITE-GANG

TEAMED FOR

BETTER METHODS OF SAND PREPARATION



B & P NITE-GANG



B & P MAGNARATOR

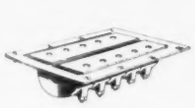
BEARDSLEY AND PIPER knows that *complete* sand preparation includes *complete* magnetic separation — uses DINGS electric and non-electric magnetic pulleys and drums in its line of sand preparation units and Sandslingers.

DINGS offers the foundry industry the newest, most complete, most powerful line of magnets and magnetic separators made — from low cost Alnico Perma-Plates to rugged lifting magnets and the most powerful self-cleaning rectangular suspended magnet yet — DINGS RM, for pulling the largest pieces of iron from deep burdened, fast moving belts. Let your DINGS representative tell you about the latest developments in magnets for foundries.

DINGS MAGNETIC SEPARATOR COMPANY

4708 W. Electric Ave., Milwaukee 46, Wisconsin

Send for NEW Bulletin 653 containing construction data, operating principles and illustrations of the complete DINGS line.



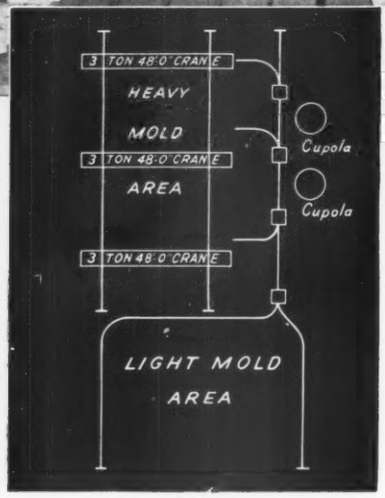
NON-ELECTRIC PERMA-PLATE MAGNETS

PERMA-DRUM

LIFTING MAGNETS

RM RECTANGULAR SUSPENDED MAGNET

DINGS MAGNETS



FOUNDRY SYSTEM SPEEDS PRODUCTION . . . and PAYS for itself

A careful check of all costs revealed that the entire Cleveland Tramrail materials handling system in the foundry shown above paid for itself in less than one year.

Because the equipment speeded production and improved plant efficiency, costs were lowered considerably. The savings thus effected more than paid for the system the first year.

The equipment is of the hand-propelled type and includes three 48-foot cranes, a 200-foot runway and other trackage, switches, hoists and carriers.

The cranes serve the heavy mold area. Hot metal is conveyed directly from cupolas to molds in this section. In the light mold area the metal is transported on the overhead rail system and transferred into hand pouring ladles for distribution.

Hundreds of foundries are speeding production and profiting from installations of Cleveland Tramrail.

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy

CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
3823 EAST 286th ST. WICKLIFFE, OHIO.

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

(*Concluded from page* 174)

ciently, usually within a period of 24 hours, the mold is lifted out of the pit and transported to the shakeout floor. The flasks are removed, and the sand is shaken out and later reconditioned for further use. The casting is carried to the cleaning room and given a rough overhaul with pneumatic chisels while in an upribht position. It is then turned on its side for the convenience of the operator armed with a cutting torch. After the main body of the riser has been removed in this manner, the remaining stump is ground down to the general contour of the pot bottom by a power-driven grinding wheel manipulated by a skilled operator.

Following the rough cleaning and riser removal, the pot is placed in an annealing pit as shown in Fig. 10 to relieve any possible internal strains. It remains in the pit for approximately a week, depending on the composition of the metal, metal thickness and overall size. After a second and more thorough cleaning, the inside surface of the dome is ground smooth in preparation for a copper coating. Skilled molding practice and high class facing materials produce castings that require a minimum amount of cleaning. No machining is required, even for the supporting pin holes in the brackets. Holes are accurately cored for fitting in the field.

Bottom Copper Coated

Introduced in 1940 and now widely specified, copper coating on the inside pot bottom prevents entrained metal in the slag from sticking to the pot face. Pure copper wire is melted by oxyacetylene flame as it is fed into the gun by an air-driven motor. Escaping air also blasts the metal particles through the flame and onto the pot wall.

Cinder pot rims are band sawed at the centers of the corrugated openings to permit thermal expansion and contraction without permanent distortion. This precaution permits return to the original truly circular or oval shape. Rims have been parts of the Johnston cinder pots since 1941. However, the Mackintosh-Hemphill Co., continues to make some rimless cinder pots.

All cinder pots are carefully inspected before shipment. Many of the principal features are shown in Fig. 14—corrugated walls for fast cooling, sawed rim and copper-coated bottom. The castings are shipped in inverted position on ordinary railroad flat cars and are mounted on special chassis by the user.

Shell Molding

(*Continued from page* 101)

with metallic grit or other material will not result in proper backup under such overhanging contours. Thus, special equipment to assure proper packing of the backup material may be necessary. Such equipment might include a rollover device to properly back up the "drag" portion of a mold and the use of a "spring-loaded" bottom board, etc., to maintain pressure on the backup material.

Many improvements undoubtedly will be made in the shell making equipment currently available. However, the potential economies of the process are such that production application of the process cannot wait for future improvements, which can be incorporated when they become available.

Mechanized Shell Molding Unit—A mechanized shell molding unit will contain the following major items of equipment:

1. Sand and resin hoppers with required handling equipment.
2. Dust-tight, sand-resin mixing unit or units with weighing equipment.
3. Sand-resin conveying equipment to shell producing machine or machines.
4. Shell producing machine or machines with mechanical shell removing equipment.
5. Shell mold assembly stations or conveyors.
6. Powered mold conveyor.
7. Flask filling station for shot or sand, including vibrating device.
8. Pouring station.
9. Exhaust for pouring station and mold cooling tunnel.
10. Shakeout station including shot or sand return conveyors.
11. Backup material cooling and cleaning equipment.
12. Shot or sand storage bins.
13. Optional casting cooling and conveying unit to Cleaning Department (or transportation in tote boxes).
14. Conventional shot blasting equipment using very fine shot.

Raw Material Requirements — In production planning the quantity of raw materials used must be determined. Data developed on small 15 x 16-in. shells about 3/16 to ¼-in. thick indicate that 1.74 lb of sand-resin mix are required per square foot of pattern plate area. Similarly, data developed on 20.5 x 26-in. shells about ¼ to ⅜ in. thick indicate that 3.1 lb of sand-resin mix are required per square foot of pattern plate area. These figures will vary considerably because of pattern contours and will vary almost directly with shell thickness.

A figure of 270 lb per cubic foot has been developed for the metallic backup material used. The sand-resin mix used may be in the range of 95 per cent sand and 5 per cent resin by weight to 93 per cent sand and 7 per cent resin by weight. The requirement for prepared release agent emulsion may run in the range of from 2 to 3 pints per ton of sand-resin mix used.

Equipment Layouts—Plans shown by the accompanying layouts were developed for our Indianapolis Works foundry, but will serve to show the equipment layout and processes involved in a relatively large production installation for shell molding. The production layout for "Contour Process Molding" as shown in Figs. 21 and 22 produces a conservative average of 3200 molds per 16-hour day (14 hours of molding) for castings not exceeding the 20 x 36-in. pattern size of a shell making machine or 20 x 18-in. mold size.

A rotary machine in Plan A (Fig. 21) was chosen for high production of a single item. Plan B (Fig. 22), with the single station machines, was designed for production of a variety of parts, giving more flexibility, but with higher handling costs.

Sand and Resin Mixing—The sand is to be delivered by lift truck and dumped into a floor level sand hopper attached to an elevator. Here the sand is elevated to an overhead storage hopper. The resin, in barrels, is also delivered by lift truck, placed in a barrel skip hoist, hoisted and discharged into an overhead resin storage hopper. Just below the sand and resin storage hoppers are the necessary discharge and feeding devices. A two-way chute delivers the sand and resin to a weigh batch hopper. From the weigh batch hopper the proportioned sand and resin is chuted into a dust tight mixer. After the sand and resin are thoroughly mixed (approximately 15 minutes), the mixture is discharged into a storage hopper located above the rotary shell mold machine in Plan A. In Plan B is an identical storage hopper with the exception that it feeds a screw type conveyor which conveys the sand-resin mixture to the individual hoppers on the single station machines. A second screw conveyor returns excess sand-resin mixture to the storage hopper.

It is to be noted that we believe that all sand and resin handling equipment should be made dust tight. It seems impractical to exhaust since

(*Concluded on page* 182)

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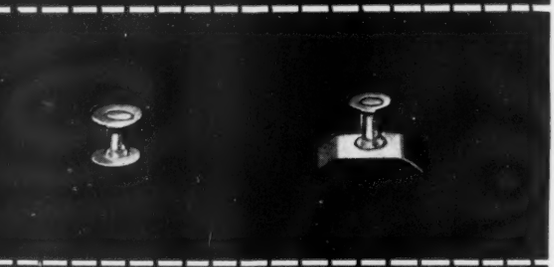
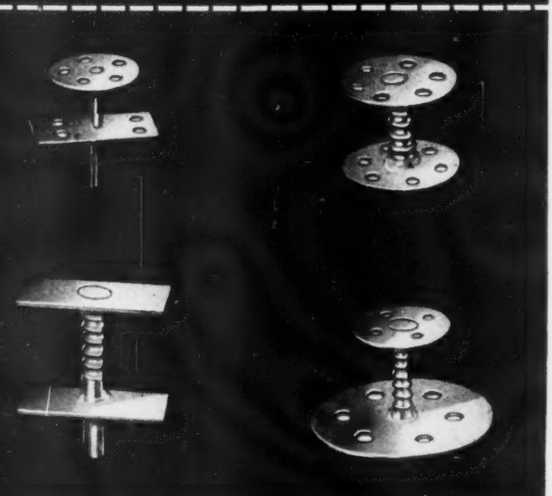
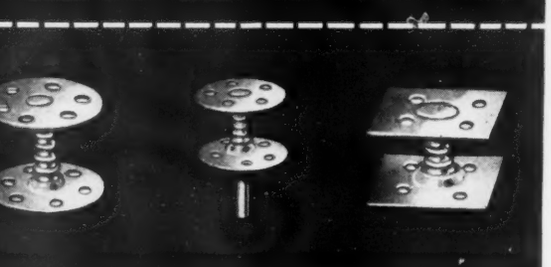
Type of Application	Type of Chaplet Used
STOVE BURNERS	
RADIATOR SECTIONS	
GASOLINE OR DIESEL ENGINES	
PUMP CASTINGS	
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PROPOSED TENTATIVE

SPECIFICATION FOR COPPER-BASE ALLOY CENTRIFUGAL CASTINGS

ASTM Designation: B 000—52T

Issued, 1952

Scope

1. (*a*) This specification covers centrifugally cast copper-base alloys having the following ASTM classification and alloy numbers. When material is ordered under this specification, the purchaser should specify ASTM B—Tentative, followed by the proper ASTM designation and alloy number from the table below to identify the material required.

(*b*) The term "centrifugally cast" shall be limited to castings which are cast in metal or nonmetallic refractory molds and spun on their own axes during solidification.

Samples for Chemical Analysis

2. (*a*) A lot shall consist of all the castings from one melt except that when similar castings from several melts weighing less than 500 lb each in the rough, are involved, a lot shall consist of not more than 5,000 lb of rough castings of the same alloy, kind, and size submitted for inspection at the same time. When two or more furnaces or crucible melts are used to charge a ladle for a pouring, the castings produced therefrom shall be considered as coming from a single melt.

ASTM Classification and Alloy Numbers

Classification	Alloy Number	ASTM Designation
Leaded high-strength yellow brass	A and B	B 132
Tin bronze	1A and 1B	B 143
Leaded tin bronze	2A and 2B	B 143
High leaded tin bronze	3A, 3B, 3C, 3D, 3E	B 144
Leaded red brass	4A and 4B	B 145
Leaded semi-red brass	5A and 5B	B 145
Leaded yellow brass	6A, 6B, 6C	B 146
Leaded high-strength yellow brass	7A	B 147
High-strength yellow brass	8A, 8B, 8C	B 147
Aluminum bronze	9A, 9B, 9C, 9D	B 148
Leaded nickel brass	10A	B 149
Leaded nickel bronze	11A and 11B	B 149
Silicon bronze	12A	B 198
Silicon brass	13A and 13B	B 198

(*b*) A sample for chemical analysis shall be taken from each lot as defined above in Paragraph (*a*). Samples shall be obtained directly from the castings or a test coupon and shall be representative of the material. The drillings or millings shall be taken from sound metal. They shall be fine, clean, and free from oil, dirt, or foreign matter.

Physical Testing

3. (*a*) A lot shall consist of similar castings of the same alloy manufactured by identical procedures, submitted for inspection at the same time. The lot shall not exceed 5000 lb, rough casting weight, except in the case of single castings

(*b*) When practicable, castings shall have extra length sufficient to provide necessary test specimens, or an additional casting shall be provided to represent each lot.

(*c*) Separately cast test bars may be provided, when extra length on castings from which specimens can be prepared is impracticable, and when there are less than 10 castings or 500 lb or rough castings in the lot, or when specimens of the required dimensions cannot be machined from castings.

(*d*) When a separately cast coupon is authorized, the manufacturer shall assume responsibility of providing sufficient coupons. Where statically cast bars are used to represent castings produced in sand-lined molds, the bars shall be cast to the form and dimensions appearing in the Tentative Recommended Practice for Tension Test Specimens for Copper-Base Alloys for Sand Castings (ASTM Designation: B 208). Where castings are produced in chill molds of metal or graphite, test coupons may be cast in open keel block molds of the same material as the molds used for the castings. Test coupons shall be positively identified with the castings they represent. Where castings are heat treated, test coupons shall be heat treated with the castings they represent.

(*e*) If any test specimen shows defective machining or reveals casting defects, it may be discarded and replaced by another specimen selected by the inspector.

(*f*) The specimens shall be made and tested at the expense of the manufacturer. The inspector shall witness the testing.

(*g*) One specimen shall be tested. If the physical requirements are met by this one test, the lot shall be accepted. If the first test specimen fails to conform to the requirements specified, another specimen shall be tested.

Other Requirements

4. For all other requirements, such as chemical and physical, reference should be made to the tables in the body of the static casting specification for the class of alloy desired, also, to the sections in the static casting specification for methods of testing, inspection, workmanship and finish, marking, certification, rejection, and methods of analysis.

Additional copies of this specification may be obtained from the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., for a nominal sum.

REVISIONS OF ASTM TENTATIVE SPECIFICATIONS

Tentative Specifications for ALUMINUM-BASE ALLOY SAND CASTINGS (B 26-50T)

Appendix.—Revise to read as follows:

"The data in the following tables IV and V are approximate and are supplied for general information only."

Table IV.—Retain Table IV, *Typical Yield Strengths* without change.

New Table.—Add a new Table V titled *Properties and Characteristics* to read as shown below.

Table V—Properties and Characteristics

			Foundry Characteristics					Other Characteristics								
Alloy	Pattern Shrinkage Allowance in./ft.[m]	Approx. Melting Range, F[o]	Resistance to Hot-Cracking[a]	Pressure Tightness	Fluidity[b]	Solidification Shrinkage Tendency[c]	Normally Heat Treated	Resistance to Corrosion[d]	Machining[e]	Polishing[f]	Electroplating[g]	Anodizing (Appearance)[h]	Chemical Oxide Coating (Protection)[i]	Strength at Elevated Temp.[j]	Suitability for Welding[k]	Suitable for Brazing[l]
C4A	5/32	970 to 1190	4	4	3	3	Yes	3	2	2	1	2	3	3	3	No
CG100A	5/32	965 to 1155	3	3	3	3	Yes	4	1	2	1	3	4	1	4	No
CN42A	5/32	990 to 1175	4	3	3	4	Yes	4	2	2	1	3	4	1	4	No
CS43A	5/32	970 to 1160	2	2	2	2	No	4	3	3	2	3	3	3	2	No
CS72A	5/32	965 to 1160	3	3	2	3	No	5	2	2	2	3	4	3	3	No
G4A	5/32	1110 to 1185	4	5	5	5	No	1	1	1	5	1	1	2	4	No
G10A	1/10	840 to 1120	2	5	4	5	Yes	1	1	1	4	1	1	(n)	5	No
GS42A	5/32	1090 to 1170	3	4	3	4	No	1	2	2	4	2	1	3	4	No
S5A	5/32	1065 to 1170	1	1	1	1	No	2	5	5	2	5	2	4	1	Ltd.
S5B	5/32	1065 to 1170	1	1	1	1	No	3	5	5	2	5	2	4	1	Ltd.
SC51A	5/32	1015 to 1150	1	1	1	1	Yes	3	3	3	1	4	2	2	2	No
SC64B	5/32	950 to 1125	2	2	2	2	Yes	3	3	4	2	4	3	3	2	No
SC64C	5/32	960 to 1120	2	2	2	2	Yes	3	3	4	2	4	3	3	2	No
SC82A	5/32	960 to 1135	1	1	1	1	Yes	3	4	5	2	4	2	2	2	No
SG70A	5/32	1035 to 1135	1	1	1	1	Yes	2	4	5	2	4	2	3	2	No
ZC81A	3/16	.....	5	3	4	4	Aged Only	2	1	1	2	2	3	5	4	Yes
ZG32A	3/16	1030 to 1175	5	3	4	4	Aged Only	2	1	1	3	2	2	5	4	Yes
ZG42A	3/16	1020 to 1170	5	3	4	4	Yes	2	1	1	3	2	2	5	4	Yes
ZG61A	3/16	.....	5	3	4	4	Aged Only	2	1	1	2	2	3	5	4	Yes
ZG61B	3/16	1105 to 1195	5	3	4	4	Aged Only	2	1	1[e]	2	2	3	5	4	Yes

Note.—1 indicates best of group, 5 indicates poorest of group.

[a] Ability of alloy to withstand contraction stresses while cooling through hot-short or brittle temperature range.

[b] Ability of liquid alloy to flow readily in mold and fill thin sections.

[c] Decrease in volume accompanying freezing of alloy and measure of amount of compensating feed metal required in form of risers.

[d] Based on alloy resistance in standard type salt spray test.

[e] Composite rating based on ease of cutting, chip characteristics, quality of finish and tool life. Ratings, in the case of heat-treatable alloys, based on—T6 temper. Other tempers, particularly the annealed temper, may have lower rating.

[f] Composite rating based on ease and speed of polishing and quality of finish provided by typical polishing procedure.

[g] Ability of casting to take and hold an electroplate applied by present standard methods.

[h] Rated on lightness of color, brightness and uniformity of clear anodized coating applied in sulphuric acid electrolyte.

[i] Rated on combined resistance of coating and base alloy to corrosion.

[j] Rating based on tensile and yield strengths at temperatures up to 500 F, after prolonged heating at testing temperature.

[k] Based on ability of material to be fusion-welded with filler rod of same alloy.

[l] Refers to suitability of alloy to withstand brazing temperatures without excessive distortion or melting.

[m] Allowances for average castings. Shrinkage requirements will vary with intricacy of design and dimensions.

[n] Not recommended for service at elevated temperatures.

[o] Temperatures of solidus and liquidus are indicated, pouring temperatures will be higher.

Tentative Specifications for ALUMINUM-BASE ALLOY PERMANENT MOLD CASTINGS (B 108-50T)

Appendix.—Revise to read as follows:

"The data in the following Tables IV and V are approximate and are supplied for general information only."

Table IV.—Retain Table IV, *Typical Yield Strengths* without change.

New Table.—Add a new Table V titled *Properties and Characteristics* to read as shown below.

Table V—Properties and Characteristics

		Foundry Characteristics					Other Characteristics								
Alloy	Approximate Melting Range, F[m]	Resistance to Hot Cracking[a]	Pressure Tightness	Fluidity[b]	Solidification Shrinkage Tendency[c]	Normally Heat Treated	Resistance to Corrosion[d]	Machining[e]	Polishing[f]	Electroplating[g]	Anodizing (Appearance)[h]	Chemical Oxide Coating (Protection)[i]	Strength at Elevated Temp.[j]	Suitability for Welding[k]	Suitable for Brazing
CG100A	965 to 1155	4	4	3	4	Yes	5	1	2	1	3	4	1	4	No
CN42A	990 to 1175	4	4	3	4	Yes	4	2	2	1	2	3	1	4	No
CS42A	970 to 1170	4	3	3	3	Yes	4	3	2	1	3	2	2	4	No
CS66A	930 to 1110	2	3	3	3	Yes	5	3	2	2	4	3	2	4	No
CS72A	965 to 1160	3	3	2	3	No	5	2	2	2	3	4	3	4	No
CS104A	945 to 1110	2	3	2	3	No	5	2	2	5	4	5	2	3	No
GS42A	1090 to 1170	3	4	4	4	No	1	1	1	5	2	1	3	5	No
GZ42A	1075 to 1180	4	5	5	4	No	1	1	1	4	1	1	3	5	No
S5A	1065 to 1170	1	1	1	2	No	2	5	4	2	4	2	4	1	Ltd.
S5B	1065 to 1170	1	1	1	2	No	3	5	4	2	4	2	4	1	Ltd.
SC51A	1015 to 1150	1	1	2	2	Yes	3	3	3	2	4	2	2	2	No
SC64A	970 to 1135	2	2	2	2	No	4	3	3	2	3	3	3	2	No
SC64B	950 to 1125	2	2	2	3	Yes	3	3	3	2	4	3	3	2	No
SC64C	960 to 1120	2	2	2	3	Yes	3	3	3	2	4	3	3	2	No
SC122A	980 to 1060	1	2	1	3	Yes	3	4	5	3	5	2	2	2	No
SG70A	1035 to 1135	1	1	2	1	Yes	2	3	3	1	4	2	3	2	No
SN122A	1000 to 1050	1	2	1	3	Yes	3	4	5	4	5	2	2	2	No
ZC60A	1120 to 1190	5	4	4	5	Aged Only	2	1	1	2	1	2	5	4	Yes
ZC81B	.....	5	4	4	5	Aged Only	2	1	1	2	1	2	5	4	Yes
ZG32A	1030 to 1175	5	4	4	5	Aged Only	2	1	1	3	1	2	5	4	Yes
ZG42A	1020 to 1170	5	4	4	5	Yes	2	1	1	3	1	2	5	4	Yes

Note.—1 indicates best of group; 5 indicates poorest of group.

[a] Ability of alloy to withstand stresses from contraction while cooling through hot-short or brittle temperature range.

[b] Ability of liquid alloy to flow readily in mold and fill thin sections.

[c] Decrease in volume accompanying freezing of alloy and measure of amount of compensating feed metal required in form of risers.

[d] Based on resistance of alloy in standard type salt spray test.

[e] Composite rating based on ease of cutting, chip characteristics, quality of finish and tool life. Ratings, in the case of heat-treatable alloys, based on—T6 temper. Other tempers, particularly the annealed temper, may have lower rating.

[f] Composite rating based on ease and speed of polishing and quality of finish provided by typical polishing procedure.

[g] Ability of casting to take and hold an electroplate applied by present standard methods.

[h] Rated on lightness of color, brightness and uniformity of clear anodized coating applied in sulphuric acid electrolyte.

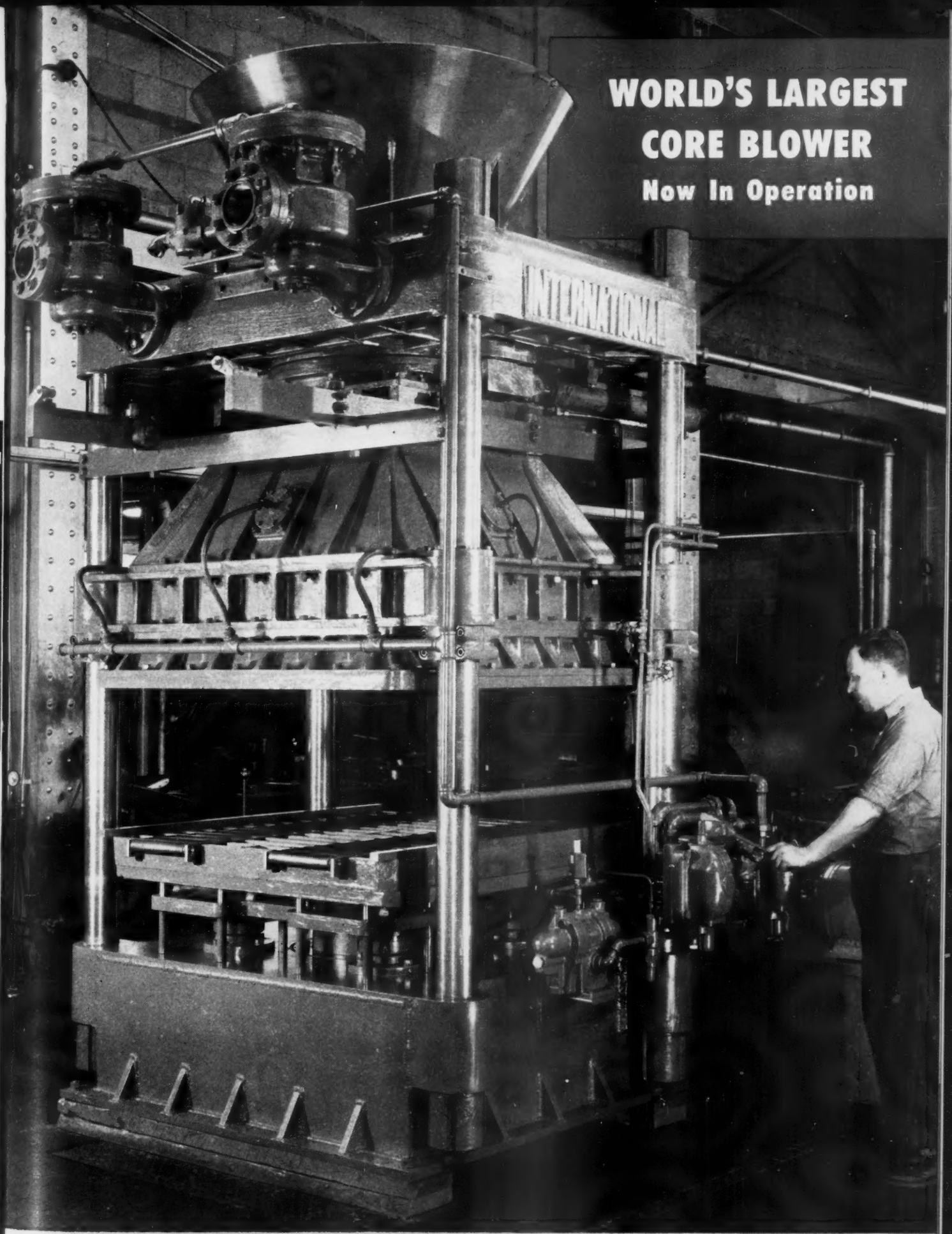
[i] Rated on combined resistance of coating and base alloy to corrosion.

[j] Rating based on tensile and yield strengths at temperatures up to 500 F, after prolonged heating at testing temperature.

[k] Based on ability of material to be fusion-welded with filler rod of same alloy.

[l] Refers to suitability of alloy to withstand brazing temperatures without excessive distortion or melting.

[m] Temperatures of solidus and liquidus are indicated, pouring temperatures will be higher.



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(*Concluded from page 177*)

the sand used is 100 mesh and the resin is approximately 200 mesh or finer.

Shell Production—The sequence of operations within the shell making machine is as follows:

1. Preheat pattern.
2. Spray pattern with release agent.
3. Coat pattern with sand-resin mixture.
4. Dump excess sand-resin mixture.
5. Cure or bake shells.
6. Eject shells.

In Plan A, a rotary type machine equipped with six individual shell making machines was chosen for high production and long runs of single items. In this plan the sand-resin mixture will be delivered and metered directly from the overhead storage hopper to each shell making machine as it rotates under the hopper. In Plan B the separately mounted shell machine are provided for flexibility for molding various parts if desired.

With separately mounted machines as in Plan B it is necessary to provide conveying equipment to deliver the sand mixture to each individual machine. This would probably be an enclosed type screw conveyor. It also will be necessary to provide a return screw conveyor to bring back to the storage hopper any sand mixture not metered out to the shell making machines.

Through experience in actual operation at Manufacturing Research it was found that shells direct from the machine were too hot to handle manually for any length of time. In order to remove a shell every 15 seconds, a mechanical shell transfer device synchronized with the rotary shell mold machine and vertical cooling conveyor was incorporated in the Plan A layout. It was found that approximately 20 minutes was required to cool the shells from 500° F to 125° F with forced ventilation so that the shells could be handled manually both comfortably and continuously.

In Plan B it will probably not be feasible to use mechanical unloading devices; hence the shells will be removed by hand and placed on the tiered racks of the horizontal cooling conveyor. This cooling conveyor should be hooded and exhausted to remove the fumes and heat.

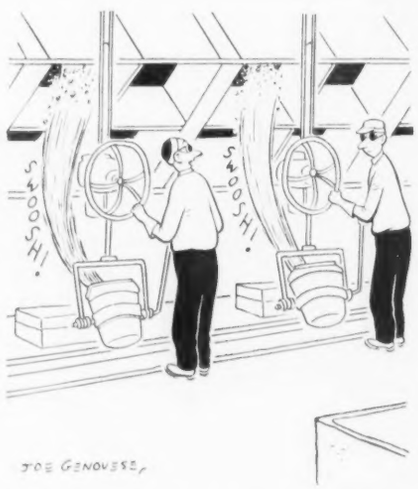
In both Plans A and B the shells will be removed by hand from the cooling conveyors and placed on the shell assembly belt conveyor. The two shells are assembled, and covers are placed on the pouring basins. The molds are then placed in the flasks, or the excess shells are stored for future use in adjoining racks.

Shot Filling and Metal Pouring—Overhead grit or shot storage bins are provided from which an operator proceeds to fill the closed bottom flasks with grit or shot to back up the assembled molds previously placed in the flasks. Flexible hoses connected to the bin discharge valves are used to direct the grit into the flasks at points desired. As the flasks are filled, they are also vibrated for a few seconds to pack the grit firmly around the assembled shell molds. Slots in the yokes of the flask conveyor hangers permit the flask to rise and fall at the vibrator.

Immediately after filling the flask with grit has been completed, the molten metal can be poured into the molds from ladles on the pouring loop. To prevent possible damage to the castings at the shakeout, approximately 25 minutes is allowed for cooling in a tunnel from which the fumes should be exhausted.

Shakeout and Grit Reclamation—After the cooling, a special flask rollover device at the shakeout empties the flask of grit, shell and casting with sprue attached. The casting and attached sprue are shaken down and discharged into cooling baskets which are set in a pit at the front of the shakeout. The loaded baskets are then placed on the basket type casting cooling conveyor with the aid of a jib crane.

In developing the shell mold procedure it was necessary that equipment be provided to clean and cool the grit before returning the material to the grit storage bin. As the grit, broken shells and sprues drop through the grating of the shakeout, a vibrating underground conveyor screens the grit and fine sand at the lower end of the conveyor. The larger particles of shell and pieces of metal carry over the screen to the extreme end of the conveyor onto a belt. Then the broken shells and sprues are transported by the belt conveyor to the shell crusher, where a magnetic pulley removes all iron particles before the shells enter the crusher. The shells are then crushed and returned to the underground vibrating conveyor for re-screening.



"Don't you think they turned up the exhaust a little high this morning?"

The fine grit and sand which has been screened is elevated and discharged into a sand and grit separator. From this point the cleaned grit is conveyed to a grit quenching drum, where it is washed and cooled to approximately 150° F. From here the grit enters the drier to remove all moisture in order to prevent rusting. The fine sand and resin removed from the shot in the cleaner may be discarded or processed to reclaim the sand if desired.

When the grit emerges from the drier, a bucket elevator at the discharge end of the drier conveys the cooled clean grit to an overhead vibrating conveyor to return it to the storage bins near the pouring area for reuse.

Combustion and Explosion Hazards—In the shell molding process, certain hazardous conditions exist, such as potential dust explosion and possible spontaneous combustion. As a result of discussions between representatives of Manufacturing Research and Factory Mutual Engineering Division, the following conclusions and recommendations were made by Factory Mutual concerning the use of a phenol-formaldehyde resin.

1. It does not appear that the shell molding process will introduce any substantial additional foundry hazard. A sample of phenol-formaldehyde resin was submitted to Factory Mutual Laboratories to be tested for spontaneous heating and dust explosion properties. Although the material was exposed to standard test conditions for seven hours, there was no evidence of spontaneous heating. Dust explosion tests, however, indicated that the material is definitely hazardous from this viewpoint. The resin is in a class comparable to wheat flour and, accordingly, could develop explosion pressures up to 15 psi. Undoubtedly, continued good housekeeping should prevent accumulations of this material, which readily could be dispersed and could produce a severe explosion.

2. Ventilated hoods should be provided over molding machines to carry off fumes.

3. Storage of resin should be kept under sprinkler protection.

4. Care should be taken to avoid dusty conditions during mixing of the sand and the powdered resin.

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PATTERNS—Their Relation To Castings Production

ABC of Foundry Practice

Part II

By T. H. TREVITHICK

WOOD patterns are classified broadly as one-piece, two-piece or split, matched or boarded, skeletons, sections and sweeps. With the coreboxes these make up the equipment for green sand or dry sand molding. The style of molding adopted depends to a considerable extent on the general characteristics of the anticipated casting.

Skeleton, section and sweep patterns generally are employed for making heavy castings in dry sand or loam molds. Green sand molds find widest application in the production of light castings in large quantities. In the generally accepted sense a dry sand core is made in a corebox, dried in an oven and then placed in a mold to form an opening in the casting. In some instances, particularly where heavy castings are concerned, a number of dry sand cores are assembled to form the outside wall of the mold. Additional cores, suitably anchored in place, form the required opening or openings, in the casting.

Cores vary widely in size, shape and composition. Depending largely on local conditions, the silica sand is bonded with oil, cereal, pitch, gum, dextrine, and cement usually available in prepared proprietary form by firms catering to the foundry trade.

A pattern is graded according to the quality of the material and workmanship. Life or actual production service depends on these features. While the type of pattern sometimes indicates the casting requirements, it must not be confused with the grade. For example, a first-grade pattern may be only a section. On the other hand, a one-piece or split pattern may be a third-grade job. With a metal pattern the grade of material and workmanship varies according to production requirements.

Second-grade wood patterns include: First-class pine patterns trimmed with hard wood; first-class construction; all loose pieces to be hardwood; fillets wax or leather; three coats of shellac. Will produce 100 to 500 castings in gray iron, brass or malleable iron or 50 to 200 steel castings. Cost 80 per cent.

Third-grade wood patterns cover: Good pine patterns put together with nails and glue; leather and wax fillets; two coats of shellac. Good for producing from 50 to 200 gray iron, brass or malleable iron castings, or 25 to 100 steel castings. Approximate cost 60 per cent. Patterns remaining in the sand from two to four days receive special attention.

Fourth class refers to: Cheap pine pattern, cheap construction, square joints; put together with nails and glue, paper or putty fillets; one coat of shellac. Good for producing one to three gray iron, brass or malleable iron castings, or one or two steel castings. Approximate cost 50 per cent. Applicable only to malleable iron castings weighing 5 lb or more.

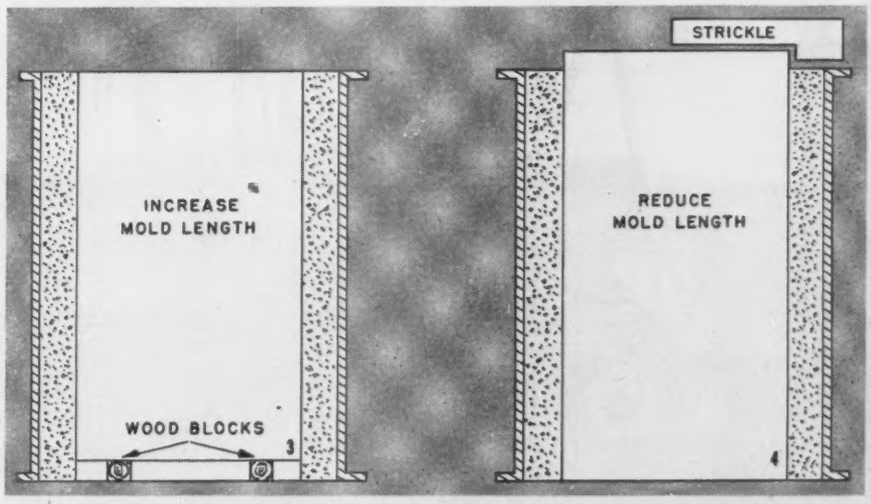
Standard construction is essential in first-class sweeps and sections. Sweeps are to be hard wood. Cutting edge and all wearing surfaces to be faced with sheet steel. All interchangeable parts used in connection with sweeps to be hard wood and located on sweep with brass pins and bushings and secured in place when in use with wood screws. Coreboxes of good construction have locked corners fastened together with glue and screws. All pads and ribs to be cleated across the end grain of the wood to prevent warping. Joints to be tongued and grooved and secured with glue and screws. Corner joints on frame to be reinforced with angle iron. Three coats of shellac. Good for producing 10 to 50 castings. Approximate cost 100 per cent.

Second-class sweeps call for the cheapest possible construction, with as little hand work as possible. Parts are sanded just as they come from the machine. No hand tooling. All motor pads, generator pads and cross ribs to be in one-piece without cleats. Coreboxes put together with glue and nails, square joints. Corner joints on frame to be halved together and fastened with screws without reinforcement. All constructed from No. 1, Barn white pine. One coat of shellac. Good for producing one or two castings. Cost 60 per cent. Sweep base shows saving of 80 to 85 per cent over solid pattern.

First-class metal patterns of gray iron, brass or aluminum are made to suit foundry conditions. Aluminum coreboxes are faced with steel on all wearing surfaces, and equipped with hardened steel pins and bushings. Pattern is mounted on wood or cast iron plate, or gated according to the size and conditions required in the foundry. When brass is specified by the foundry, a good grade of yellow brass is finished all over to a perfectly smooth surface. Coreboxes are equipped with hardened steel pins. Coreboxes may be either cast iron or aluminum equipped with hardened steel pins and bushings. Core driers and vent plates furnished as required. Good for production of 1000 to 10,000 castings. Cost 100 per cent.

Second-class metal patterns are usually white metal and produced as duplicated from a single pattern. Alloy for nonshrinkable white metal

(*Concluded on page* 188)



Figs. 3-4—How to increase or decrease the height of patterns molded on end

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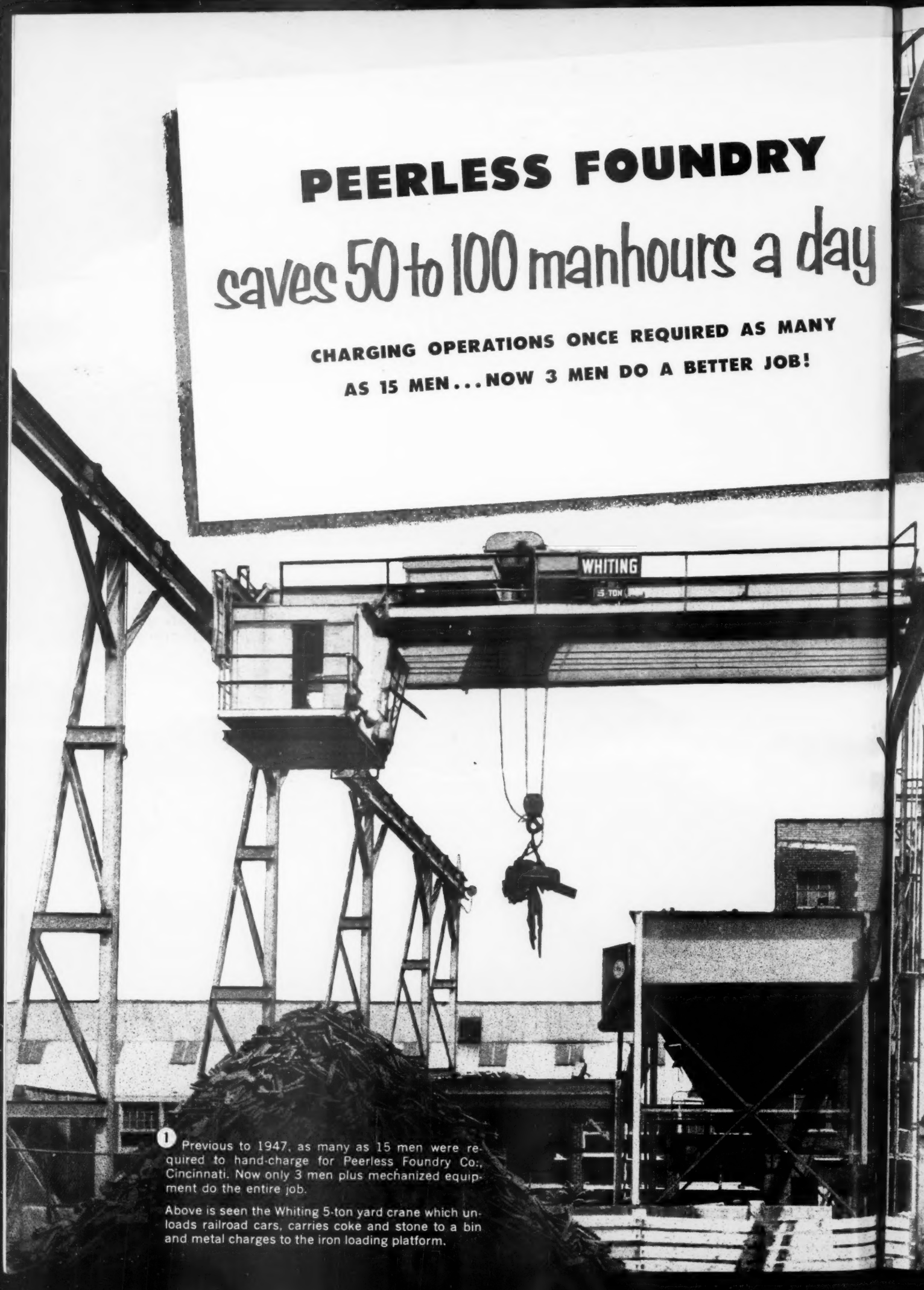
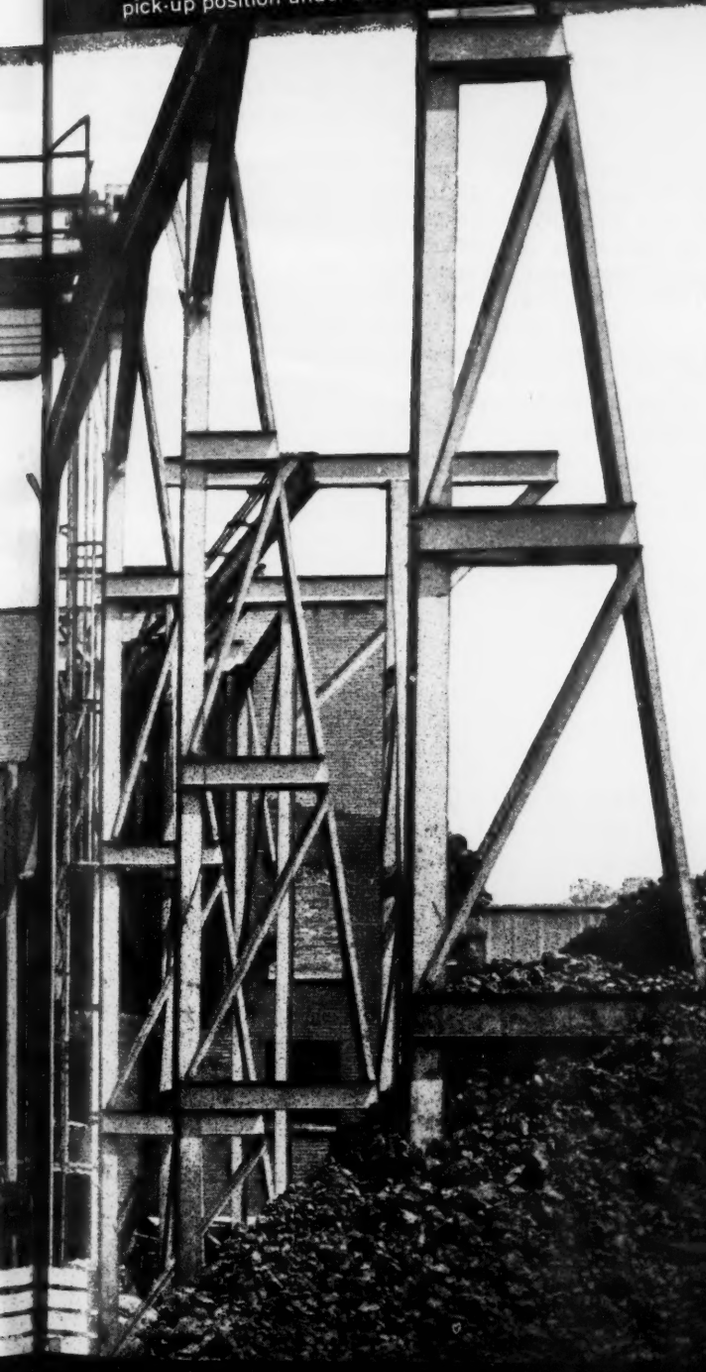


1 Previous to 1947, as many as 15 men were required to hand-charge for Peerless Foundry Co., Cincinnati. Now only 3 men plus mechanized equipment do the entire job.

Above is seen the Whiting 5-ton yard crane which unloads railroad cars, carries coke and stone to a bin and metal charges to the iron loading platform.

(2) This transfer car at Peerless Foundry is carrying two Whiting Cone-Bottom buckets. They have received the weighed charge from the iron weigh hopper and the coke and stone weigh hopper and are now moving to the bucket pick-up position under the monorail charger.

(3) The Whiting I-Beam monorail charging crane carries the loaded cone-bottom buckets to the two Whiting Cupolas which are used alternately.



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(*Concluded from page* 185)

contains 78 per cent tin, 14 per cent antimony, 8 per cent lead. Not necessary to make a master pattern. Approximate cost 80 per cent.

For minimum production where soft wood pattern cannot be used, pattern may be aluminum or mahogany to suit foundry conditions and mounted on wood plate. Coreboxes are aluminum. From this rigging 500 to 1000 castings can be produced. Cost 80 per cent.

Third-class embraces white metal, either hand pattern or gate of patterns. Rough finish except on drawing surfaces. Good for production of 100 to 250 castings. Approximate cost 75 per cent.

Two kinds of pattern changes generally are recognized in most industrial plants—a permanent change and a setup or temporary change.

In the permanent change, a change where the original pattern is altered radically, the pattern loses its former identity and never again is used in its original shape.

In the setup or temporary change the original or basic pattern does not lose its former identity, but may be available later to fill an order in the original form. The basic pattern is preserved in a manner that it can be used again in the original form.

In making a permanent change the patternmaker does not have to keep in mind the fact that the original shape and size must be maintained. He has not the same problem as when he has to maintain the original pattern. Therefore the expense of the job usually is not as great.

Changes on patterns, especially permanent changes, should not amount to the original cost. In certain instances where the basic pattern is held for future use if necessary, the cost of the change may equal the original cost. However, two or more patterns may exist where one was present before. The expense may be justified. If careful study shows that the permanent change cannot be made for less than the original cost of the pattern, nothing is gained by making a change. It is better and more economical to make a new pattern. Yet sometimes the designer or draftsman who is not familiar with pattern construction is inclined to err in this direction.

Consider a plain cylinder or barrel-shape pattern carrying a number of bosses or other projecting members. This type of pattern usually is constructed by binding up staves or segments. The main body is finished by turning in the lathe. Later the centers are obliterated or destroyed. Should the drawing require a reduction in outside diameter, the expense of cutting down this body would be prohibitive. Increasing the outside diameter may be accomplished easily and readily by adding narrow strips of lagging built up evenly on an established form. Internal passages in a corebox may be reduced by adding lagging strips in a similar manner. Even in complicated forms the same general technique is applicable. This thought constantly should be in the patternmaker's mind while making a change in the design of a pattern.

It is comparatively easy to increase or decrease the height of a cylindrical or other pattern molded on end. The usual method for increasing the height is to ram sand around the existing pattern to the top. Remove the pattern temporarily and place wood blocks (Fig. 3) in the bottom of the mold corresponding to the desired increased height of the pattern. The pattern then is returned to the mold and sand is rammed around it up to the new parting line.

For a permanent change, an extra part would be fastened on the original pattern. A setup designed to maintain the original would have the pieces put on in a manner to be removed easily. Screws and dowel pins usually are employed for this purpose. Setups may be called for a number of times on the same basic pattern. In each case the original or any subsequent pattern must be maintained to meet further casting orders.

Several methods are available for decreasing the height of a mold made from an over length pattern. In the method shown in the accompanying illustration, the flask is rammed to the required height, with the pattern projecting the required distance above the joint. A short strickle, with one end resting on the pattern and the other end resting on the flask, is employed to form a parting. The pattern then is removed and the mold is covered with a slab core or a flat cope (Fig. 4).

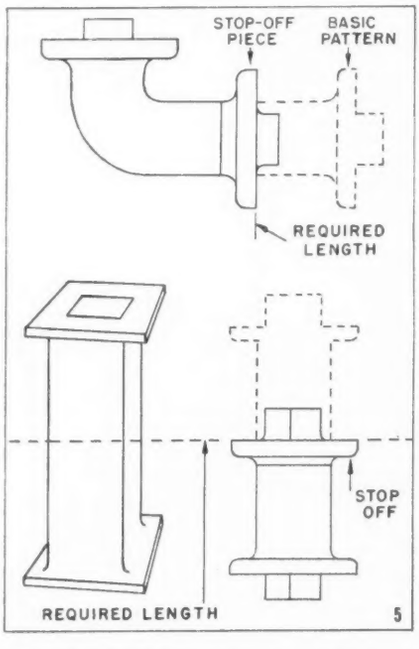

Fig. 5—Flexible pattern constructed with removable joints and fillets

In making a setup, pieces usually are added to the basic pattern. Sometimes it is necessary to change the construction of the original pattern to permit these changes to be made. Therefore it is important, if at all possible, that the designer should be expected to use the particular design in another modified form. This should be kept in mind in making the original layout. Preferably, the original drawing should accompany the setup drawing. It is realized, of course, that this is not always possible.

Changing projections, boss centers, cored openings, etc., generally offers no serious complications. Usually all or nearly all changes are minor. Occasionally the basic body of the pattern is changed to an extent that renders a setup impractical. When a doubt arises the proper procedure is to get in touch with the patternmaker and discuss the matter. This usually will result in a compromise resulting in considerable saving in pattern cost.

Consider, for example, a steam valve casting where the main body diameter and cored openings are fixed, but where flanges of varying diameter are required, and where different lengths may be necessary. The pattern is constructed in such a manner that the flanges and fillets are removable. The main body is jointed vertically in the center so that a section may be taken out for shortening, or a piece inserted for adding to the length (Fig. 5). This basic pattern is flexible enough to take care of several different valve castings that otherwise would involve the construction of several patterns.

The corebox is designed and constructed in a similar manner and may be contracted or expanded easily and with little time and expense.

The original pattern is not necessarily confined to one change or setup. In many instances from 15 to 20 changes are made from one basic pattern. It is not advisable to go too far in this direction. Production may be required from one of the group while another is in use in the foundry, thus tying up the basic pattern. Generally, four or five different setups from one pattern is enough, depending of course on the nature of the work and the activity of the pattern.

(*To be continued next month*)

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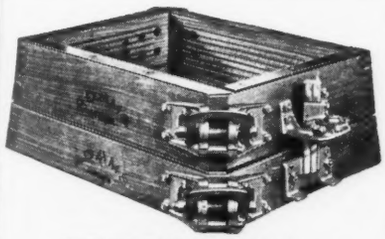

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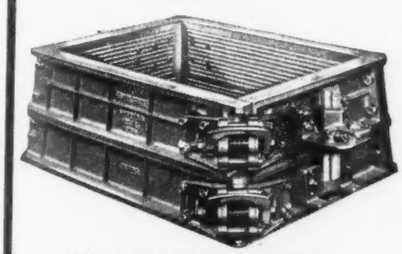

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OBITUARY

FRANK Cordes, 82, former chairman and president, Blaw-Knox Co., Pittsburgh, died Oct. 20. Mr. Cordes was associated with various steel foundries until 1927 when he became president-general manager of the Lewis Foundry & Machine Co., which was merged with Blaw-Knox two years later. In 1936 Mr. Cordes was named president of Blaw-Knox Co., and the following year was elected chairman of the board. In 1943 he resigned his official connection with the company, remaining a director, and from that time until his retirement in 1946 was president-general manager of Pittsburgh Steel Foundry Corp., Glassport, Pa.

* * *

William F. Hoernke, 75, until his retirement in 1948 plant superintendent, Wisconsin Appleton Co., South Milwaukee, Wis., died there Sept. 19. Mr. Hoernke had been associated with the company 53 years. He entered the foundry industry in 1890 as a molder apprentice at the former Northwestern Malleable Iron Co., Milwaukee. In 1943 he was recipient of an honorary award from Wisconsin Chapter of the AFS for more than 50 years of foundry service.

* * *

Gilbert F. Close, 71, until his retirement last year public relations director, General Steel Castings Corp., Granite City, Ill., died Oct. 25. Mr. Close joined Commonwealth Steel Co. in 1920, remaining when it was acquired by General Steel Castings Corp. Prior to that he was confidential secretary to President Woodrow Wilson.

* * *

Dallas W. Miller, 70, former superintendent of the core department, General Steel Casting Corp., Granite City, Ill., died there Oct. 7. Prior to his retirement Mr. Miller had been associated with the company for 28 years.

* *

Dr. George M. Enos, 56, professor of physical metallurgy, Purdue University, West Lafayette, Ind., died Oct. 27. Dr. Enos had been active in the work of staging the annual Metals Casting Conferences. He joined the university staff in 1946.

* * *

Marcel Remy, 74, outstanding Belgian foundryman, died Aug. 2. A native of Liege, Belgium, Mr. Remy for a time was a professor at the Ecole Superieure de Fonderie. Until the age of 30 he was head of the drafting department of a large manufacturing plant in Remicourt. In 1908 he founded his own company at Herstal, specializing in malleable iron castings. An expert on malleable castings he made several visits to United States where he was well known in malleable circles. In 1929 Mr. Remy was elected president of the Belgian Foundry Association, which he continued to serve during his lifetime.

* * *

Edward T. Runge, president, E. T. Runge & Associates, Cleveland, and well known for many years as a cost consultant and business analyst for the gray iron foundry industry, died Oct. 31. Mr. Runge developed his cost system early in his career while associated with Cyrus H. McCormick, founder of International Harvester Co., Chicago. At one time he was associated with the former Tri-State Foundrymen's Association and did work under the auspices of the old Ohio State Foundrymen's Association. More recently he was associated with the Gray Iron Founders' Society, which cited him in 1947 for his many years of work as a foundry consultant.

* * *

Frederic S. Ferguson, 79, founder and president, Standard Foundry & Supply Co. Ltd., Windsor, Ont., died Oct. 24 following a long illness. Mr. Ferguson, a native of St. Thomas, Ont., entered the foundry industry as a coremaker there. In 1917 he went to Windsor and established his own company. He also operated the Apex Foundry, Detroit, from 1928 to 1939.

* * *

Irvin Bair, 79, director and former president, Kutztown Foundry & Machine Corp., Kutztown, Pa., died there Oct. 5. Mr. Bair joined the company in 1900 and since then had been secretary, treasurer, vice president and president.

* * *

Steven Ambrose, 77, former superintendent of the core department, Ferro Machine & Foundry Inc., Cleveland, died Oct. 21. Mr. Ambrose, who had been associated with the company for 42 years, retired in 1944.

* * *

S. Ralph Main, 58, manager and treasurer, Joplin Foundry Co., Joplin, Mo., died Oct. 4, following a short illness.

* * *

Arthur K. Higgins, 44, assistant director of research, Allis-Chalmers Mfg. Co., Milwaukee, died Nov. 6. Mr. Higgins was graduated from University of Wisconsin and was associated with American Smelting & Refining Co., New York, and Globe Union Mfg. Co., Milwaukee, until 1937 when he joined Allis-Chalmers. Last year he was named assistant director of research in charge of the metallurgical, chemical, melting and precision casting sections and the physics laboratories of the company. Mr. Higgins was chairman of the Brass and Bronze Division of the American Foundrymen's Society and a member of its Technical Correlation Committee.

* * *

E. N. Delahunt, general superintendent, Warden King Ltd., Division of Crane Ltd., Montreal, Que., died Oct. 31. Mr. Delahunt was born in Chester, Pa., and was graduated from Catholic University, Washington, in 1917. Following military service he joined the Bridgeport, Conn., division of Crane Co., Chicago, and in 1928 was transferred to Crane Ltd., Montreal, as factory engineer in charge of rebuilding the Warden King Ltd. Division. He became plant superintendent of the latter division in 1928 and general superintendent in 1945. Mr. Delahunt was one of the organizers of the Eastern Canada-Newfoundland Chapter of the AFS and served as its chairman in 1943-44. He was a national director of the AFS from 1947-1950.

* * *

Walter B. Tetzlaff, 60, president, Flour City Ornamental Iron Co., Minneapolis, died Oct. 27. Following graduation from Concordia College, St. Paul, Mr. Tetzlaff studied the art of ornamental metalwork in Germany. In 1912 he joined Flour City Ornamental Iron Co., which his father had founded in 1893. He had been president since 1940.

* * *

Wencel Veverka Sr., 86, until his retirement in 1932 superintendent of the Westinghouse Electric Corp. Cleveland foundry, died Nov. 8 in that city. Mr. Veverka joined Westinghouse as a molder in his native Pittsburgh and was transferred to Cleveland in 1917 as superintendent.

* * *

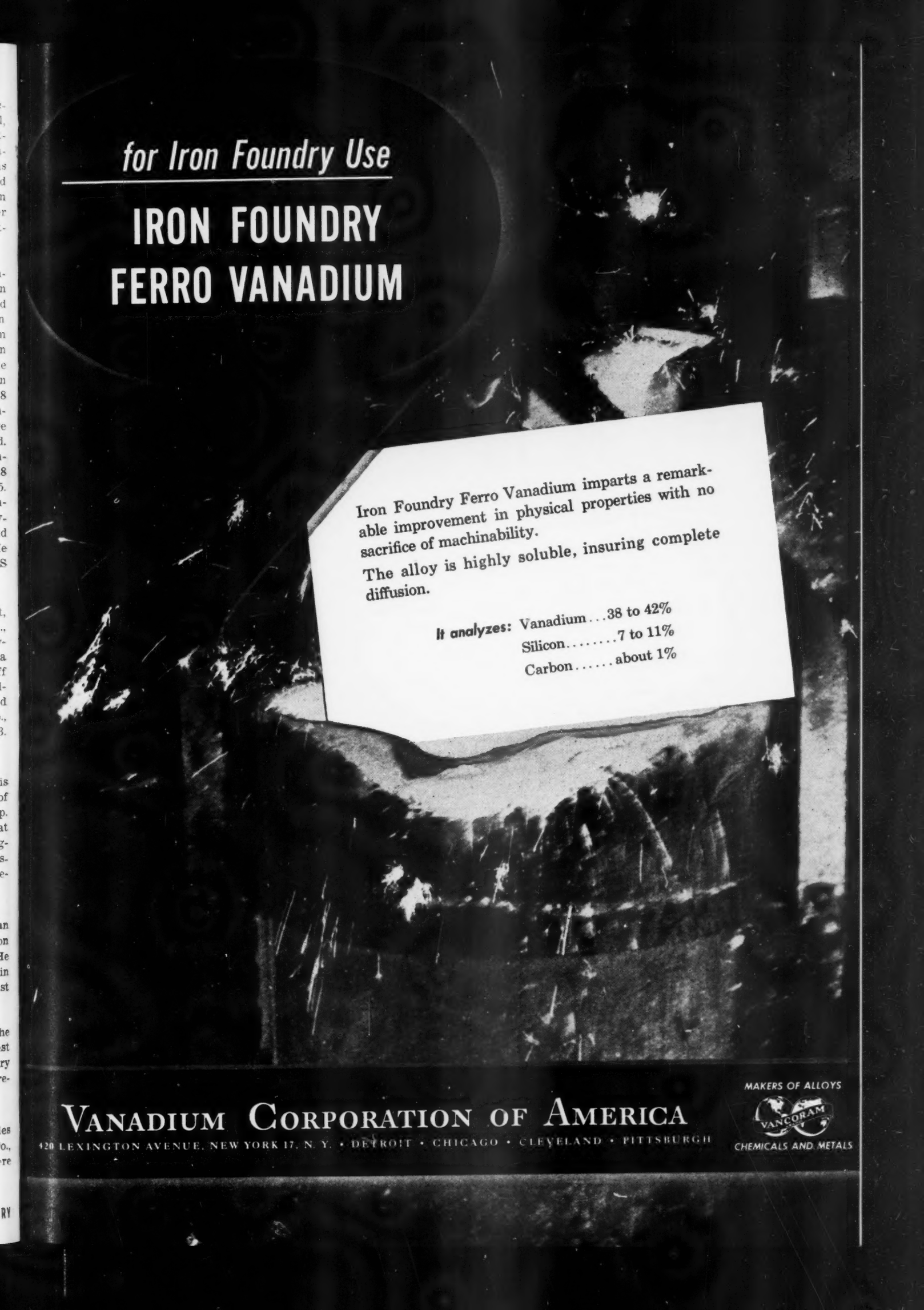
Fred H. Haggerson, 68, chairman of the board, Union Carbide & Carbon Corp., New York, died Oct. 14. He became president of the company in 1944 and was elected chairman last year.

* * *

John F. Koepsell, 74, founder of the former North End Foundry, West Allis, Wis., died Nov. 1. His foundry discontinued operations when he retired in 1945.

* * *

Nicodemus J. Henning, 53, sales manager, Illinois Malleable Iron Co., Chicago, died at his home there Oct. 21.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Activities of Foundry

GROUPS

Chicago

FIRST of the season's roundtable type meetings was conducted by the Chicago Chapter, AFS, Nov. 3. Slightly over 200 members and guests attended the dinner at the Chicago Bar Association and participated in the three group sessions.

Chapter President John H. Owen presided at the general portion of the meeting and Vice President John A. Rassenfoss introduced roundtable panelists and chairmen. It was announced that as a semi-experimental venture, the Mar. 2 meeting would be held at the Del Prado Hotel on Chicago's south side for the convenience of members located in that area.

The Gray Iron, Malleable and Pattern divisions joined hands in presenting one of the roundtables, this devoted to "The 3 P's of Ductile Iron —Production, Problems and Possibilities." Fred E. Kasch, assistant foundry superintendent, Howard Foundry Co., was chairman, and Harold W. Ruf, director of research and development, Grede Foundries Inc., Milwaukee, was the speaker.

"Nonferrous Foundry Problems" was the subject discussed in the roundtable sponsored by the nonferrous division. The panel of experts consisted of Chester K. Faunt, manager, Christensen & Olsen Foundry Co., and E. E. Henry, foundry superintendent, Hammond Brass Works. Chairman was William L. Rudin, chief engineer, Elesco Smelting Corp., and chairman of the Nonferrous division.

The Steel division chose "Your Foundry Problems" as the topic for its roundtable under chairmanship of Albert P. DiGirolamo, foundry foreman, Chicago Steel Foundry Co. The panelists were John C. Mulholland, foundry metallurgist, Pettibone Mulliken Corp., and Roy C. Nelsen, district manager, Sterling Wheelbarrow Co.

The chapter's Dec. 1 meeting at Chicago Bar Association will feature the AFS color-sound movie "Effect of Gating Design on Casting Quality." Narrator of the film will be Walter Bonsack, vice president and director of research, Christiansen Corp.—*Erle F. Ross.*

Washington

A TALK on "Smoke Pollution and What It Means for Northwest Industry," by John Rosene, engineer and acting director of smoke control for the city of Tacoma, Wash., was of timely interest to foundrymen at the Oct. 17 meeting of the Washington Chapter of AFS. The meeting was held at Top o' the Ocean restaurant in Tacoma.

Mr. Rosene believes the industry's own technical personnel can provide the solution to its pollution problems. These men should create a voluntary pollution abatement committee and should meet and discuss openly their mutual problems. He recommended that foundrymen seek improvement of community relations and through support would gain a reasonable control of some type pollution abatement program. He pointed out that air pollution is an engineering problem and developing a program should be limited to those with proper knowledge. — *Harold R. Wolfer, Puget Sound Naval Shipyard*

Southern California

A CLINIC on problem iron castings was featured at the Oct. 10 meeting of the Southern California Chapter of the AFS. Approximately 100 members and guests of the chapter met at the Rodger Young Auditorium to participate in the discussion. Speakers panel included James E. Eppley, Axelson Mfg. Co.; B. M. Campbell, Dayton Foundry; Robert Gregg, Reliance Regulator Division, American Meter Mfg. Co., and H. W. Howell, Howell Foundry.

(*Continued on page* 194)

CHICAGO Chapter of the AFS heard Bernard N. Ames, right, senior metallurgist and head of the casting development and foundry practices section of the materials laboratory, New York Naval Shipyard, discuss "The Shell Molding Process—Present and Future" at the opening meeting of the season. On left, front row, third from left, Chairman H. G. Haines of the Educational Committee is shown with a group of foundry instructors from Chicago technical high schools who were chapter guests. Photos by I. H. Dennen, advertising manager, Beardsley & Piper, Division of Pettibone Mulliken Corp.

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SOUTHERN CALIFORNIA chapter of the AFS met Oct. 10 at Rodger Young Auditorium, Los Angeles, to conduct a clinic on problem iron castings. The speaker panel consisted of, left to right: B. M. Campbell, Dayton Foundry; H. W. Howell, Howell Foundry Co.; Robert Gregg, Reliance Regulator Division, American Meter Mfg. Co., and James E. Eppley, Axelson Mfg. Co. Photo by courtesy of K. F. Sheckler, Calmo Engineering Co.

(*Continued from page* 192)

Each panel member described a casting which had been a problem to cast in his shop and then explained how the difficulty had been overcome. Most of those present participated in the discussion with the result that many interesting and practical ideas were made available to all.—*K. F. Sheckler, Calmo Engineering Co.*

Ontario

A PANEL discussion on "Apprenticeship Training for Foundry Personnel" was featured at the first meeting of the year by Ontario Chapter of the AFS. Members of the panel were Andrew Reyburn, Cockshutt Farm Equipment Ltd.; Robert Robertson, International Harvester Co. of Canada Ltd.; W. A. Bynum, Canadian Foundry Supplies & Equipment Ltd.; J. M. Hughes, John T. Hepburn Ltd. C. E. Maddick, Massey-Harris Co., served as chairman. There were 150 members and guests present.

First question discussed by the panel was: "What qualities make a good foundry supervisor?" It was generally agreed that technical knowledge covering fundamentals controlling the foundry process is necessary. Thorough practical knowledge is not always necessary since in large shops the foundry superintendent or manager has able assistants and his job is one of co-ordination. An even more important quality is ability to handle personnel.

The question, "What type of apprenticeship training should be made available?" brought widely varying opinions. However, the type and size of shop governs the scope of training within the organization. That is, on the job training, educational classes and whether the courses extend from several months to four years. Chief consideration seemed to be whether the foundry was endeavoring to train a mechanic or a supervisor. Biggest problem is to obtain a young man who is interested enough to remain in a foundry for several years at apprenticeship wages. As a solution, it was suggested that promising young men already in a foundry be encouraged to take educational classes broad enough to include all phases of foundry practice.

The meeting concluded with a discussion of what constitutes good sand control. Those requisites which should be subject to control at all times are base sand, grain distribution, moisture and strength.—*P. Provias, Cockshutt Farm Equipment Ltd.*

MICHIGAN STATE Student Chapter of the AFS members enjoyed coffee and doughnuts at their Oct. 14 meeting. From left to right are C. C. Sigerfoos, professor of mechanical engineering, Michigan State College; Joseph Orloff, engineer, Saginaw Malleable Division, General Motors Corp; Albert Rhoads, president, Engineering Castings Inc., Marshall, Mich.; Ernest Frens, student chapter chairman, Michigan State College; and R. V. Righter, manager, Saginaw Malleable Division, Central Foundry Division, General Motors Corp.

Michigan State

FOURTH annual get-acquainted meeting of Michigan State Student Chapter of the AFS was held Oct. 14. Speakers were Verne Righter, Central Foundry Division, General Motors Corp., Saginaw, Mich., and A. E. Rhoads, Engineering Castings Inc., Marshall, Mich., who are industrial advisors to the chapter. In addition, Joe Orloff, engineer with Saginaw Malleable division, GMC, provided a few remarks on employment and advancement opportunities in the industry. He also answered questions on shell molding. The meeting was concluded with an informal coffee and doughnuts session.—*B. L. Harding*

New Jersey

ELECTION of officers was held at the Oct. 20 meeting of the New Jersey Foundrymen's Association. H. L. Edinger, Barnett Foundry & Machine Co., Irvington, N. J., was re-elected president and A. E. Winstead, the Moore Bros. Co., Elizabeth, N. J., was re-elected vice president, John L. Carter, Montclair, N. J., and William H. Mantz, Scotch Plains, N. J., secretary and treasurer, respectively.

Also re-elected were the three directors whose terms were expiring. They are: A. W. Laytham, William P. Laytham & Sons Co., Paterson, N. J.; Max Traum, Sacks-Barlow Foundries Inc., Newark; and H. A.

(*Continued on page* 197)

No sighting is necessary to get perfect cope and drag alignment when you use Universal Flask Pins, Bushings and Closing Pins. No time is wasted. Lifting and setting *in one smooth operation* does the job with Cope Pins quickly guided to Drag Pins over tapered loose-fitting Closing Pins which are quickly removed without effort. The Elongated Flask Bushing is specially designed to permit longitudinal expansion to compensate for metal heat *without affecting accurate alignment.* Available for immediate delivery in standard sizes—special sizes and types to order. Direct your inquiries and orders to the office nearest you—1060 Broad St., Newark, N.J., and 5035 Sixth Ave., Kenosha, Wisconsin—or write to our home office.

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FRANKENMUTH 4, MICHIGAN

Produce More Castings Per Heat

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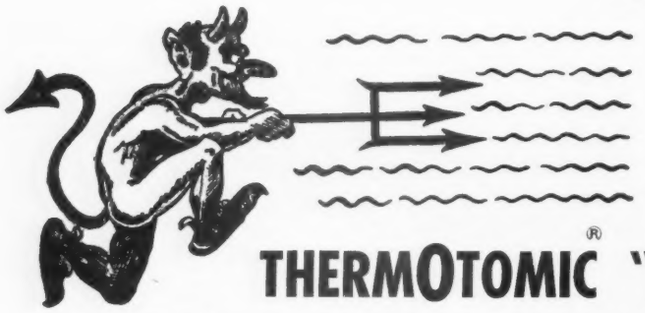


Soffel's®

THERMOTOMIC "HOTOP" LIQUIDIZER

Exothermic Carbon Free Liquidizer For Iron, Steel, Nodular Iron

This new head compound saves feeding metal in risers or feeding heads which can now be reduced in height 40 to 70%.

SOFFEL'S THERMOTOMIC HOTOP CARBON FREE LIQUIDIZER is different from other head compounds in that HOTOP LIQUIDIZER does NOT contain powdered metal, is NOT a thermit compound. It is a patented exothermic compound entirely free of carbon, sulfur and phosphorous and can be used without danger of contamination on any ferrous metal or alloy.

HOTOP LIQUIDIZER also saves molding time as less sand is needed in the mold cope due to short height of risers. HOTOP LIQUIDIZER produces a liquid slag well over 4000° F. of heat and insulates the metal. The feeding metal will remain liquid at least 50% longer assuring adequate feeding while the casting cools and solidifies. Piping and shrink cavities caused by premature freezing of the feeding metal are eliminated.

GUARANTEED TO PRODUCE SOLID CLEAN CASTINGS

SOFFEL'S FAMOUS CARBON FREE LIQUIDIZER FOR ALL METALS and ALLOYS

SOFFEL'S EXOTHERMIC CARBON FREE LIQUIDIZER is the leader in major foundries for use on both ferrous and non-ferrous metals and also in ingot production. It is the original scientific non-carbon, exothermic compound for feeding heads and risers.

When applied on the heads or risers CARBON FREE LIQUIDIZER reacts within itself exothermically, producing a temperature above 3200° F. It actually increases the temperature of the feeding metal to a point well above that of the metal in the main body of the casting, thus ensuring that the feeding metal will be the last to freeze. In this manner, shrink cavities in the casting caused by premature freezing of the feeding heads will be eliminated. After the exothermic action has ceased, the LIQUIDIZER forms a soft refractory insulating blanket on the metal. This confines the heat generated by the LIQUIDIZER and aids in maintaining the desired high temperature of the feeding metal in the heads or risers.

SOFFEL'S THERMOTOMIC COMPOUND
PATENTED
FOR ALL METALS and ALLOYS

THERMOTOMIC COMPOUND is a patented Exothermic compound that can be molded into any desired shapes and used as feeding ring inserts under risers or as facing application where it is desired to maintain fluidity of the casting metal. THERMOTOMIC permits reversal of the trend towards large feeding heads and risers, making it possible to use heads that are shorter and more compact with 1½" feeder openings. This permits easy removal of the casting feeding heads and sharp reductions in cleaning and finishing costs. When THERMOTOMIC is used as inserts or as facing mixed with molding sand in the mold, heat at thin metal sections is retained until the thick main body of the casting has solidified, thus eliminating shrink cracks and improving grain structure and tensile strength. For use in green sand molds, use THERMOTOMIC W. P. (Waterproofed)

NOTE: SOFFEL'S CARBON FREE LIQUIDIZER NO. 5 is recommended for use on top of feeding heads in conjunction with THERMOTOMIC COMPOUND. For aluminum castings, use THERMOTOMIC ABC and AL-X31 LIQUIDIZER. When ordering a trial sample, advise the kind of metal to be used on,

U. S. Patents No. 2,490,327 and No. 2,500,097

PITTSBURGH METALS PURIFYING COMPANY

World's Largest Manufacturers of Fluxes and Purifyers For All Metals and Alloys

1352 MARVISTA ST., N. S. PITTSBURGH 12, PA.

CENTRAL ILLINOIS Chapter of the AFS met on Oct. 6. Left to right are Chapter Chairman George Rockwell, superintendent of foundry planning, Caterpillar Tractor Co., Peoria, Ill.; A. V. Martens, technical chairman, president, Pekin Foundry, Pekin, Ill.; Kenneth Haagensen, director of public relations, Allis-Chalmers Mfg. Co., Milwaukee

(*Continued from page* 194)

Vreeland, North Jersey Foundry Co., Little Falls, N. J. In addition, Joseph H. Parsons, American Brake Shoe Co., New York, has been elected to the board.

Principal speaker at the meeting was John M. Price, chief, Castings & Forgings Section, OPS, Washington, who spoke informally on price controls. He also explained profit surveys which the OPS has decided to undertake in all foundry branches.—*B. K. Price*

Central Illinois

FIRST regular meeting of the 1952-53 season for Central Illinois Chapter of the AFS was held Oct. 3. Technical chairman, A. V. Martens, Pekin Foundry & Mfg. Co., Pekin, Ill., introduced Kenneth W. Haagensen, director of public relations, Allis-Chalmers Mfg. Co., Milwaukee, who spoke on "What Kind of a Salesman Are You?"

Mr. Haagensen said everyone is a salesman. Laborers are selling their labor; foremen are selling themselves to management and labor; and salesmen are selling their material products. Consequently we should act like salesmen and stress the plus values of our work and our American way of life. He advised that troubles should be discussed only where something can be done about them, not where other people may hear and get the wrong impression by not knowing all the facts.—*L. E. Kinsinger, Caterpillar Tractor Co.*

Tri-State

THERE were 55 members and guests of Tri-State Chapter of the AFS present at the Oct. 17 meeting held at Wilders Cafe, Joplin, Mo. Featured on the program was John A. Rassenfoss, research metallurgist, American Steel Foundries, East Chicago, Ind.

In discussing the chemistry of steel, Mr. Rassenfoss explained the relationship between various carbon contents and hot tears in castings. With slides to illustrate, he pointed out the importance of casting design and the influence of manganese-sulphur ratio. Even distribution of heat, control of sand and use of quality scrap also are effective in reducing hot tears, Mr. Rassenfoss pointed out.—*Fred E. Fogg, Acme Foundry & Machine Co.*

Philadelphia

OCTOBER meeting of Philadelphia Chapter of the AFS was held at the Engineers Club, Philadelphia, and was a joint meeting with the local ASM chapter. Over 300 attended.

"Quality Control" was discussed by Henry Winte, director of research, Florence Pipe Foundry & Machine Co., Florence, N. J., and Edward Shrock, quality control engineer, Lukens Steel Co., Coatesville, Pa. Technical chairman was H. N. Stuart, director of quality control, U. S. Pipe & Foundry Co., Burlington, N. J.

Important points emphasized included the belief that quality control in the foundry should be under the direction of one man who has technical training, some foundry experience and who is quality conscious. Important also is that he be able to get along with people and to gain the

(*Continued on page* 199)

PHILADELPHIA Chapter of the AFS met Oct. 10 to hear a discussion of quality control. Guest speakers for the evening were Henry C. Winte, top view, director of research, Florence Pipe Foundry & Machine Co., Florence, N. J., and Edward M. Schrock, bottom view, seated at right, quality control engineer, Lukens Steel Co., Coatesville, Pa. At left, bottom view, is H. N. Stuart, director of quality control, U. S. Pipe & Foundry Co., Burlington, N. J., who was technical chairman of the meeting. Standing in bottom view is Arnold N. Kraft, foundry manager, Wilkening Mfg. Co., Philadelphia

A partial list of Knight clients

Appleton Electric Company
South Milwaukee, Wis.

Canadian Car & Foundry Company, Ltd.
Montreal, Quebec

Crane Company
Chicago, Ill.

Dalton Foundries, Inc.
Warsaw, Indiana

Electric Steel Foundry Company
Portland, Ore.

Erie Malleable Iron Company
Erie, Pa.

Fahralloy Limited
Orillia, Ont.

Fairbanks, Morse & Company
Kansas City, Kan.

Hammond Brass Works
Hammond, Ind.

Haynes Stellite Company
Kokomo, Ind.

John Inglis, Ltd.
Toronto, Ont.

Macfarlane
Sagua la Grande, Cuba

Massey-Harris Co., Ltd.
Brantford, Ont.

Moline Malleable Iron Company
St. Charles, Ill.

National Roll & Steel Foundry
Avonmore, Pa.

Pittsburg Steel Foundry Corporation
Glassport, Pa.

Pyle-National Company
Chicago, Ill.

Spojene Tovarny Na Obrabeci Stroje
Brno, Czechoslovakia

Sulzer Bros. Ltd.
Winterthur, Switzerland

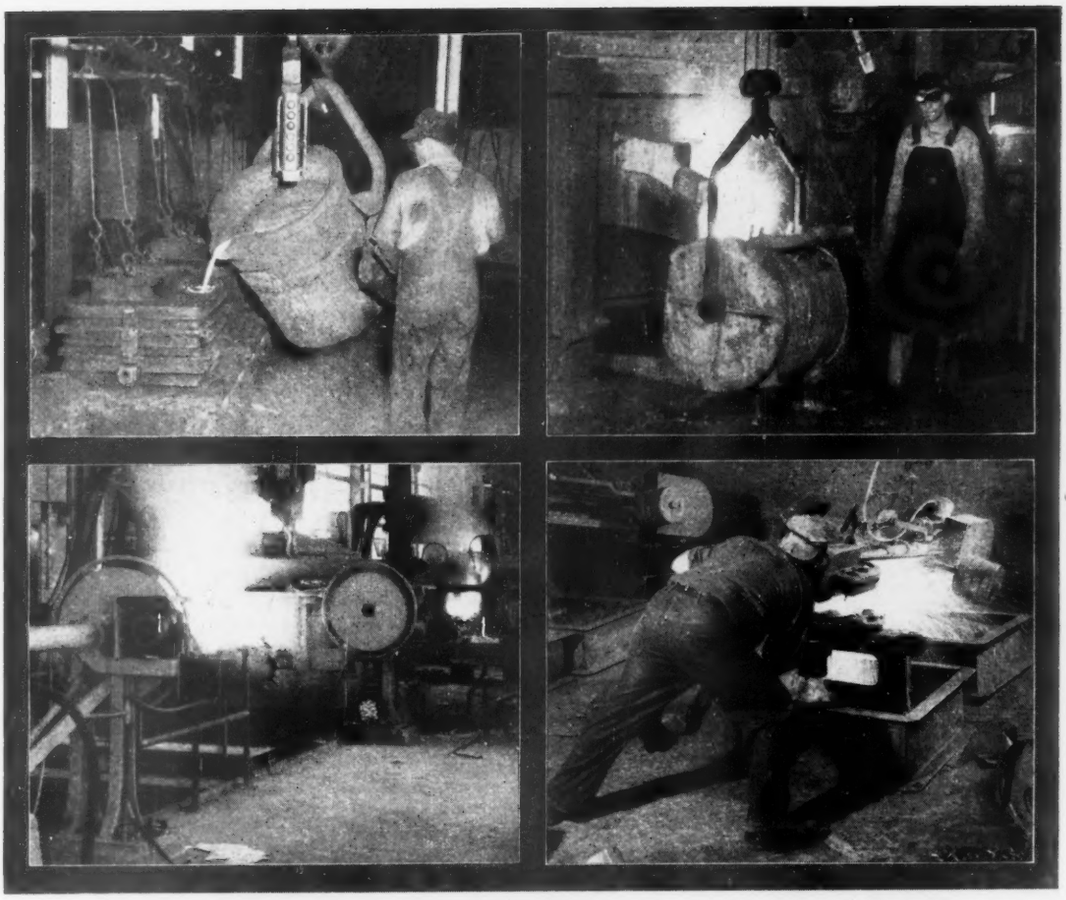
Unitcast Corporation, Ltd.
Sherbrooke, Quebec

Universal Castings Corporation
Chicago, Ill.

Wagner Malleable Iron Company
Decatur, Ill.

Woodruff & Edwards, Inc.
Elgin, Ill.

Worthington Corporation
Harrison, N. J.



Whatever Casting You Produce... Whatever Your Foundry Problem...

Call on Knight Engineering Experience to Help Reduce Your Production Costs

More than 200 successful foundry assignments have given Knight engineers and architects a practical working experience with every type of foundry—grey iron, steel, malleable, aluminum, magnesium, brass, bronze, armor, and allied products.

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confidence of operating personnel.

Quality control depends upon correct analysis of casting defects. An effective aid in this is the AFS book *Analysis of Casting Defects*. Furthermore, defects must be correlated to practices which may cause scrapped or otherwise defective castings. Control of sand properties is important in any quality control work. Pattern equipment must be maintained in good shape.

Quality control has followed improvement of personal skills, mechanical developments and statistical approach. Relationship between quality control and inspection are inseparable; and good evaluation is indispensable. Usable techniques for statistical evaluation are diagrammatic and tabular frequency distribution, quality control charts and sample tables. Quality control means predictability with assurance, and for this facts must be recorded and the records used.—*Daniel E. Best, Bethlehem Steel Co.*

Northern California

THERE were 114 members and guests present at the Sept. 15 meeting of Northern California Chapter of the AFS. S. C. Massari, technical director of the Society was the featured speaker. He showed the film "Principles of Gating," produced at Battelle Memorial Institute, Columbus, O., under the society's research program.

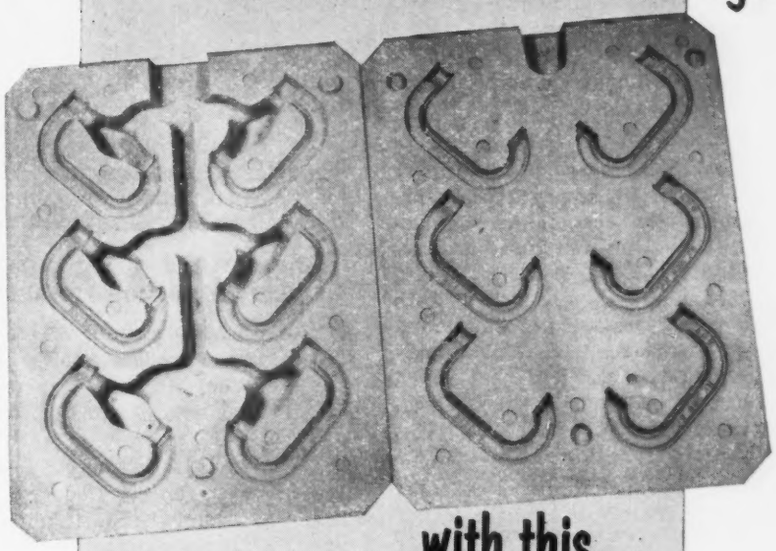
Announcement was made of the re-

(*Continued from page* 197)

NORTHERN CALIFORNIA Chapter of the AFS met Sept. 15. From left to right, Harold Henderson, secretary H. C. Macaulay Foundry Co., Berkeley, Calif., outgoing chairman of the California Regional Conference and Andrew M. Ondreyco, sales, General Metals, Oakland, Calif., incoming chairman, California Conference

SHELL MOLDS

cure faster... set more rigid



with this

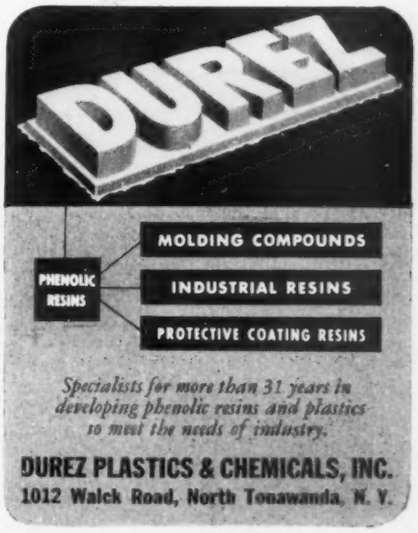
New DUREZ Phenolic Resin

Stepped-up cycles . . . Faster curing, more rigid, more warp-free shell molds can now be produced by using a new phenolic bonding resin developed by Durez. Whether or not you are using automatic equipment, the new resin enables you to turn out more molds per hour with no loss of quality in structural strength and gas-venting properties. Because of the greater hot rigidity, mold distortion is reduced. This results in greater dimensional accuracy in the casting, particularly at the parting line.

Less finishing . . . Pieces are cast to closer tolerances in shell molds bonded with our new resin. Castings have clean surfaces of almost pattern smoothness, require minimum finishing.

Where to use . . . Shell molding has proved to be economical on high production jobs as well as comparatively short runs. Gears, fittings, and other parts for industrial equipment and appliances are being cast with impressive savings in cost . . . and in various metals.

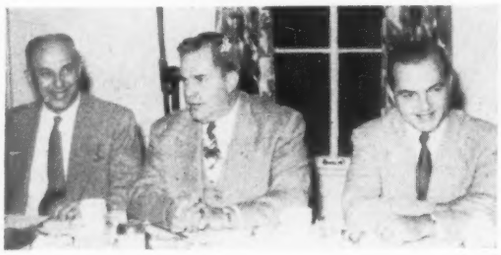
WE'RE READY TO HELP. A letter of inquiry on resins for shell molding will receive the prompt attention of our engineering staff.


DUREZ
PHENOLIC RESINS
MOLDING COMPOUNDS
INDUSTRIAL RESINS
PROTECTIVE COATING RESINS
Specialists for more than 31 years in developing phenolic resins and plastics to meet the needs of industry.
DUREZ PLASTICS & CHEMICALS, INC.
1012 Walck Road, North Tonawanda, N. Y.

31 Years of Experience makes a difference!

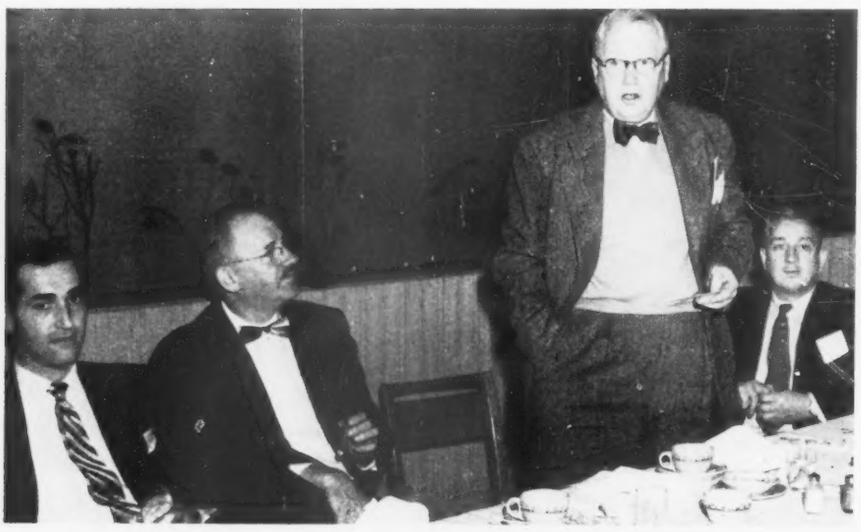
Phenolic Resins that fit the job

SAGINAW VALLEY Chapter of the AFS opened its 1952-53 season Oct. 2 with a meeting honoring the national officers, who were represented by S. C. Massari, technical director of the AFS and speaker for the evening. Left to right are Mr. Massari; Kenneth H. Priestley, president Vassar Electroloy Products Inc., Vassar, Mich., chapter chairman; chapter vice chairman F. James McDonald, Central Foundry Division, General Motors Corp.



(*Continued from page* 199)
gional foundry conference being arranged by the chapter in conjunction with the University of California. It will be held in Berkeley, Calif., Feb. 6 and 7 with meetings at both the university and Hotel Claremont. Harold Henderson, H. C. Macaulay Foundry Co., Berkeley, has served as chairman of the conference committee and since he has accepted a position with the U. S. government as sand technician in the Near East, Andrew M. Ondreyco, General Metals Co., Oakland, Calif., succeeds him in the conference planning post. Assisting Mr. Ondreyco are W. S. Gibbons, Ridge Foundry, San Leandro, Calif.; and John Bermingham, E. F. Houghton Co., San Francisco.—*Clayton D. Russell, Phoenix Iron Works*

EASTERN NEW YORK Chapter of the AFS heard John P. Holt, top view, sales engineer, Basic Refractories Inc., Cleveland, discuss "Basic Refractories" Oct. 21. In the bottom view, left to right, are E. S. Lawrence, foundry metallurgist, General Electric Co., Schenectady, N. Y.; John Waugh, foundry superintendent, General Electric Co., Schenectady; Lyman C. Thunfors, vice president and general manager, Rensselaer Valve Co., Troy, N. Y.; and Paul Wilson, foundry superintedent, James Hunter Machinery Co., North Adams, Mass.



Cleveland Non-Ferrous

CLEVELAND chapter of the Non-Ferrous Founders' Society met at the Cleveland Athletic Club Oct. 23 to hear discussions on core sands by J. J. Cleary, vice president, Sand Products Co., Cleveland, and Warner B. Bishop, manager, Foundry Products Division, Archer-Daniels-Midland Co., Cleveland. Mr. Bishop also showed his company's film, "The ADM of Cores," which depicts practical and laboratory phases of coremaking and control.

In his talk, Mr. Cleary pointed out that practically all nonferrous operators use Albany sands, offering a range of screen sizes from 35 to 300 AFS fineness. Only a small minority of shops have used synthetic sands. He went on to emphasize the importance of proper measuring and mixing core ingredients, suggesting that the use of a dried sand affords the opportunity of precise moisture control.

Mr. Bishop also emphasized the importance of moisture control, stating that a variation of 1 per cent water can vary both green and dry core strength as much as 100 per cent. He outlined the proper mixing sequence of first mulling together the sand and dry binder, then adding water followed by a short mull, and finally the core oil and completing the mulling time. Such mixing sequence has been found to give 50 per cent greater core green strength than by adding oil before the water, all quantities of ingredients being the same.—*Robert H. Herrmann.*

Saginaw Valley

TO open the current chapter year, Saginaw Valley Chapter of the AFS met Oct. 2 and had as its principal speaker S. C. Massari, technical director of AFS. Mr. Massari spoke on the flow of metal in molds and illustrated his subject with a movie, "Fluid Flow in Transparent Molds."

Carl Joseph and William Mixer were introduced to those present as AFS life members who also are associated with the Saginaw Valley Chapter. Special guests, Mr. Ross and Mr. Harris from Birlec Ltd., Birmingham, England, also were introduced.—*Roy S. Dahmer, Eaton Mfg. Co.*

Eastern New York

BASIC Refractories" was the topic discussed by John P. Holt, Basic Refractories Inc., at the Oct. 21 meeting of Eastern New York Chapter of the AFS. Meeting was held at Circle Inn, Latham, N. Y.

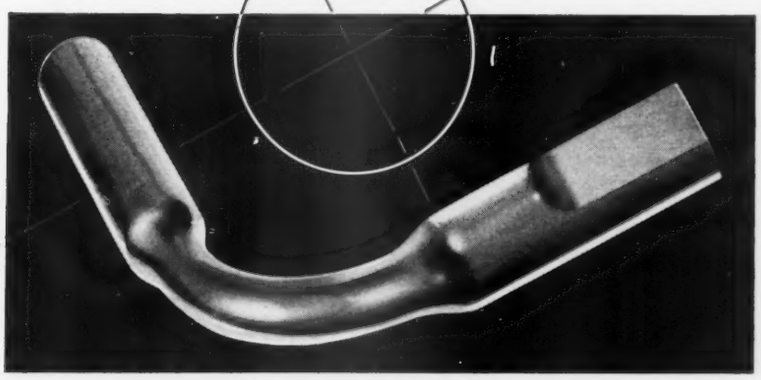
Mr. Holt introduced the subject by describing the geological locations where magnesia and chromate ores are mined and the various processes entailed in making those ores into workable refractories. Where sulphur content of iron is required to be held to a minimum and with the present difficulty in obtaining low-sulphur scrap, basic refractories are a new aid to the foundry. Although basic refractories are more expensive than the acid type, quality of the metal produced helps to offset the differ-

(*Continued on page* 202)

14.75% ELONGATION

ALMAG 35

ALUMINUM ALLOY



TENSILE STRENGTH
40,940 LBS./SQ. IN.

Standard sand-cast test bars of ALMAG 35, bent beyond 90 degrees as shown, show no sign of fracture under closest microscopic examination.

This critical test graphically demonstrates ALMAG 35's superior ability to withstand severest punishment. Tough but pliable, ALMAG 35 possesses minimum 9% and typical 13-15% elongation . . . five to seven times that obtained in conventional alloys.

ALMAG 35 offers you the highest, most stable combination of tensile strength, impact resistance and ductility of any *as-cast* aluminum alloy.

Before you specify *any* alloy, request new Bulletin 350.

COVERED by U.S. PATENTS Nos. 2564044 and 2583473.

WILLIAM F. JOBBINS INCORPORATED

AURORA, ILLINOIS

P.O. BOX 230

Electro
TRADE-MARK
SINCE 1919

Specific Purpose Grinding Wheels

Electro Specific Purpose Grinding Wheels enable you to do many more operations with abrasive wheels than you may have thought possible. In most instances, the operations will cost you less, and you will gain in output per operating hour as well as in quality of output.

May we, wholly upon our responsibility, send a qualified Field Sales Engineer to see whether Electro Specific Purpose Grinding Wheels promise enough gains in your case, to warrant changing to them as so many other high-efficiency operators have done?

Electro Refractories & Abrasives Corporation
344 Delaware Avenue, Buffalo 2, N. Y.
Regional Warehouse: Los Angeles 58, California
Plants: Buffalo, N. Y. and Cap-de-la-Madeleine, P. Q., Canada

(*Continued from page* 200)

ence.

The speaker described methods of bricking the basic cupola and, through a series of graphs, showed that in basic cupolas the depth of the slag bath determines the sulphur reduction. An interesting phenomenon still to be explained is that carbon pick-up increases with increase of limestone.

Special guest at the meeting was Martin J. O'Brien, national AFS director, who gave a brief report on the current AFS membership drive.—*Allan J. Kiesler, General Electric Co.*

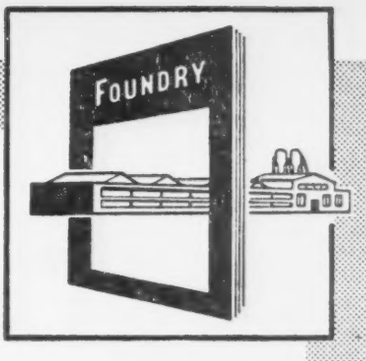
Twin City

GUEST speaker at the Oct. 14 meeting of Twin City Chapter of the AFS was Dr. Howard F. Taylor, professor of metallurgy at Massachusetts Institute of Technology.

Dr. Taylor's lecture considered the problems of risering based on elementary principles of metal solidification. He believes that improper risering is often the real cause of many casting defects which are commonly attributed to other sources such as blows, wormholes, ripples and porosity. The speaker summarized and clarified the principles of gating as presented in the AFS film produced at Battelle Memorial Institute. He stressed the advantages of using pouring basins; relatively small, streamlined gating systems; tapered down-gates with cups at the bottom; reducing the size of the cross-gate as each in-gate is passed;

(*Continued on page* 207)

TWIN CITY Chapter of the AFS held the first of a series of meetings of its casting defects committee on Sept. 24. Committee chairman Nate Levinsohn, foundry superintendent, Minneapolis-Moline Co., Minneapolis, emphasizes a point. Photo by R. J. Mulligan, Archer-Daniels-Midland Co.



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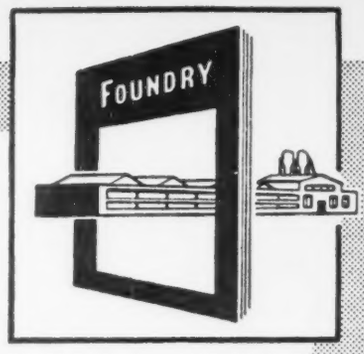

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FDY 12-52

FIRST CLASS
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BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

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FOUNDRY
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Cleveland 13, Ohio

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FOUNDRY
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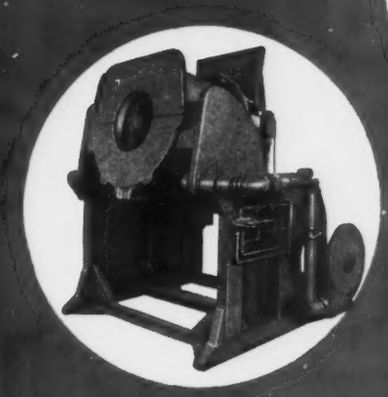
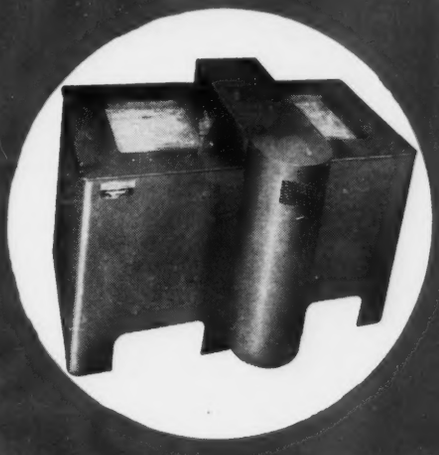
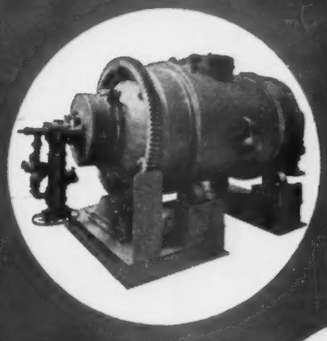
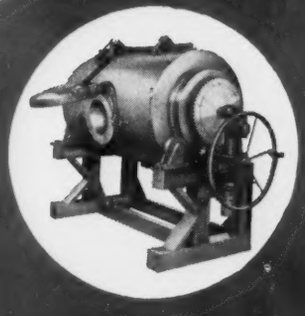
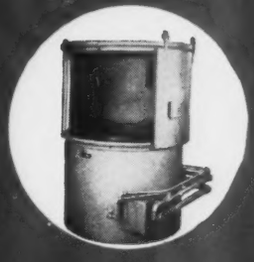


MELTING AND HOLDING FURNACES









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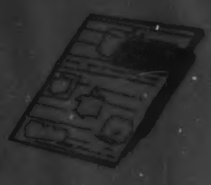

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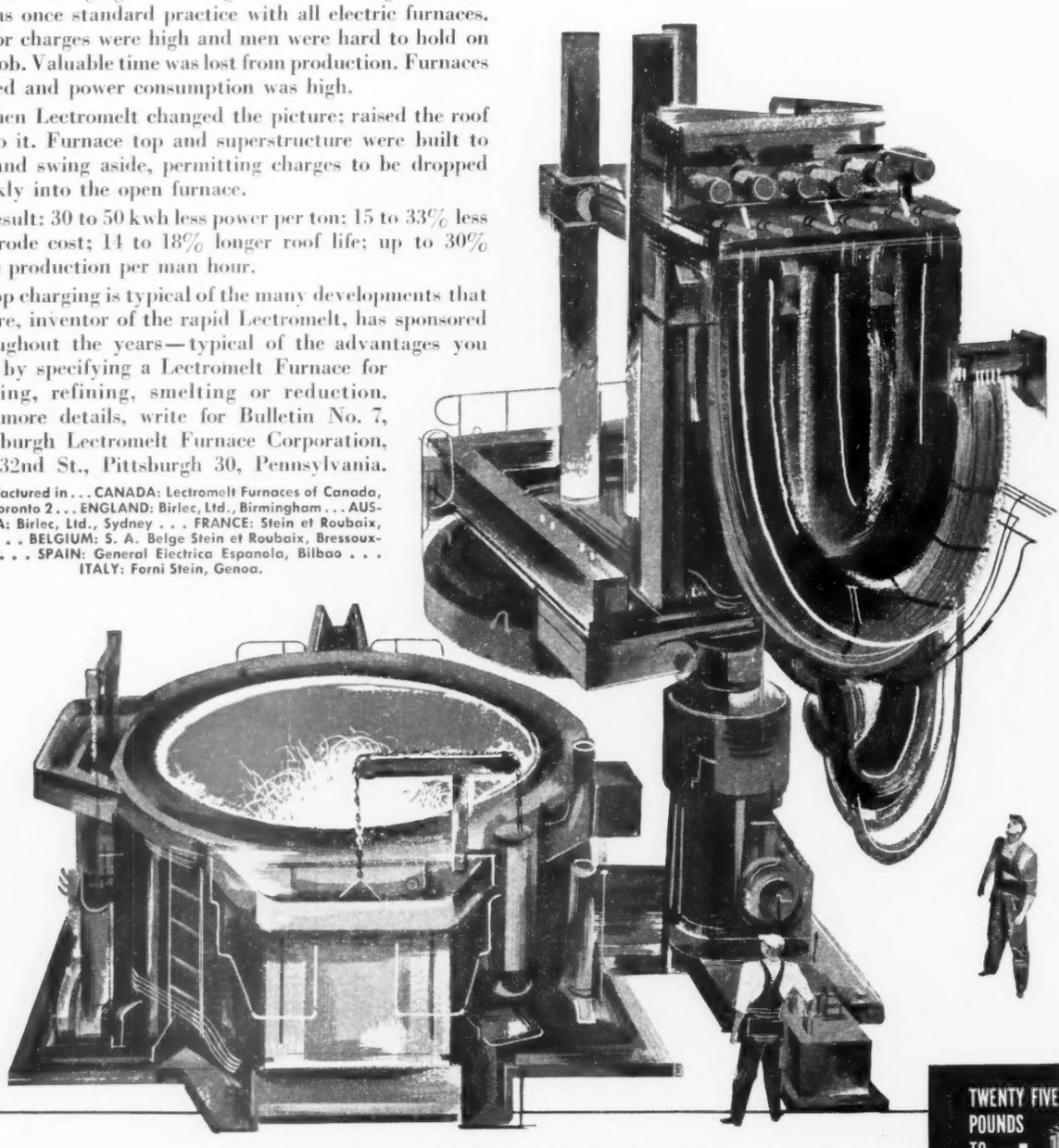


WHEN YOU MELT... MOORE RAPID *Lectromelt*

(*Continued from page* 202)

and the practice of making the gating system as part of the pattern.

The popular technical sessions were assembled following the main lecture. Dick Wilson, American Hoist & Derrick Co. as chairman of the technical session committee, had arranged a showing of "American Miracle," a film produced by General Motors Corp. It featured job setup methods in a production shop.

On Oct. 29 Nate Levinsohn, Minneapolis-Moline Co., conducted the second of a series of casting defects roundtable meetings at the Minneapolis-Moline Lake St., Minneapolis plant. The series is of particular interest to foundrymen interested in scrap reduction.

A "Student Night" was arranged by the chapter on Nov. 11. Forty to fifty selected students and apprentices from universities, vocational schools and shops in the Twin City area were invited to "Meet the Foundry Industry." George K. Dreher, executive director, Foundry Educational Foundation, introduced the students to the work of his organization and the benefits of choosing the foundry as a career.

The chapter will hold its annual Christmas party at the Nicollet Hotel, Minneapolis Dec. 16. Arrangements are under the direction of Leo Malis, Crown Iron Works—*R. J. Mulligan, Archer-Daniels-Midland Co.*

Central Michigan

PRINCIPAL speaker at the Oct. 15 meeting of the Central Michigan Chapter of AFS was Tom E. Barlow, Eastern Clay Products Department of International Minerals & Chemical Corp. The meeting was held at Hart Hotel, Battle Creek, Mich.

Mr. Barlow's subject was "Casting Defects" and he related these to deficient sands. He listed too high and too low physical properties of sand and showed casting defects which are traceable to specific sand properties.

During the chapter's business meeting, Chairman David Boyd, Engineering Castings Inc., Marshall, Mich., announced that the annual Christmas party would be held Dec. 5 at the Hart Hotel.—*R. H. Dobbins, Albion Malleable Iron Co.*

Northwestern Pennsylvania

NATIONAL officers night of the Northwestern Pennsylvania Chapter of the AFS, held Oct. 27 in Erie, Pa., was a huge success with more than 100 attending.

Earl Strick, Erie Malleable Iron Co., spoke briefly on the educational program and introduced I. R. Wagner, Electric Steel Casting Co., Indianapolis, president of the AFS. Other national officers present at the meeting and introduced were Walter L. Seelbach, Superior Foundry Inc., Cleveland, and past president of the society; William W. Maloney, secretary-treasurer. The meeting's technical speaker was S. C. Massari, AFS technical director.

Mr. Massari outlined briefly the achievements of the committee that worked on the transparent molding movie. He described the work done on the effect gating has on metal flow in a mold and also described to some extent the development of the picture which he showed, "Flow of Metal in the Mold." Mr. Massari described the different types of down sprue and runner bars and basins, and stated the theory shown with plastic molds and water has been proved with metal and sand molds.

Mr. Strick announced the death of Charles Jarecki, a chapter member who was one of the charter members of the AFS when it was organized in 1896.—*Roy A. Loder, Erie Malleable Iron Co.*

METROPOLITAN Chapter of the AFS met Oct. 6. Richard Herald, manager, Foundry Products Dept., Borden Co., New York, discussed resin core binders, ferrous and nonferrous. In the left view, left to right, are James S. Vanick, chapter chairman, International Nickel Co., Clinton F. Zabriskie, foundry metallurgist, the Sperry Gyroscope Co., Lake Success, N. Y., and Mr. Herold. In the view on the right, from left to right, are J. Fred Bauer, chapter secretary, Hickman, Williams & Co., and Howard E. Voit, chairman of the entertainment committee, Sterling Wheelbarrow Co., Milwaukee. Photos by courtesy of John Bing, Metropolitan Refractories Corp.

Metropolitan

A LARGE number of foundrymen and suppliers attended the first meeting of the season of the Metropolitan Chapter of AFS which was held at the Essex House, Newark, N. J., on Oct. 6. The subject discussed was "Resin Core Binders," and the speaker was Richard Herold, manager, Foundry Products Department, Borden Co., New York.

Mr. Herold pointed out that the use of resin binders has become more widespread within the past several years. He attributed this acceptance to the following advantages: Lower

CENTRAL MICHIGAN Chapter of the AFS met Oct. 15. Left to right are chapter vice chairman John E. Wolf, manager, gray iron division, Midwest Foundry Co., Coldwater, Mich.; speaker T. E. Barlow, sales manager, Eastern Clay Products Dept., International Minerals & Chemical Corp., Chicago; chapter chairman David Boyd, manager of technical control, Engineering Castings Inc., Marshall, Mich.; and technical chairman Beryl Sprout, Midwest Foundry Co.

WISCONSIN Chapter of the AFS was addressed at its Oct. 3 meeting by William J. Grede, left, president of Grede Foundries Inc., Milwaukee, and of the National Association of Manufacturers. In the center is A. J. Grede, vice president, Grede Foundries Inc. On right, George Risney, chapter president, Risney Foundry Equipment Co. Photo by Walter V. Napp, Delta Oil Products

overall core costs; reduced baking time which reduces fuel costs and increases oven capacity; better core physicals; smoother core surface; no volatiles to be controlled in interior of ovens or adjacent worker area; less gas; better collapsibility; and baked cores do not absorb moisture.

Clinton F. Zabriskie, Sperry Gyroscope Co., Lake Success, N. Y., served as the meeting's technical chairman. —*Andrew Devlin, Daniel Goff Co.*

Tennessee

A DISCUSSION of shell molding attracted 60 members and guests to the Oct. 17 meeting of Tennessee Chapter of the AFS held at Hotel Patten, Chattanooga. The speaker was William F. Rose, Chemical Division, Borden Co. He was introduced by W. M. Hamilton, resident manager of Crane Co.

In making shells, a four or five screen sand ranging from 80 to 160 AFS fineness with a two-stage type of thermosetting phenolic resin generally is used. According to Mr. Rose, amount of resin varies with size and shape of sand grains. No. 90 AFS sand requires from 5 to 9 per cent resin. Shell cores may be made of coarser sand starting with 80 AFS and using 4 per cent resin. Proper selection of resin is important. For instance, if the pattern design includes sharp angles or deep recesses, resin of high flowing property is needed since strength of a mold depends on the flowing property of the resin. Mr. Rose also stated that resins of higher flow require longer curing.

Molding resins, it was pointed out, are compatible with materials which may be necessary in sand to improve hot strength or finish, such as silica flour, iron oxide, zircon flour or sand. The speaker then described the dump box method of making a shell and described the changes that take place with the resin during investment and curing.

Mr. Rose stated that hardness values range from 95 to 98 and AFS permeability from 200 to 600. Hot deformation with the 100 gram load ranges from 0.10 to 0.20 in.

Many methods are now used to pour castings without backing. However, when doing so it has been found

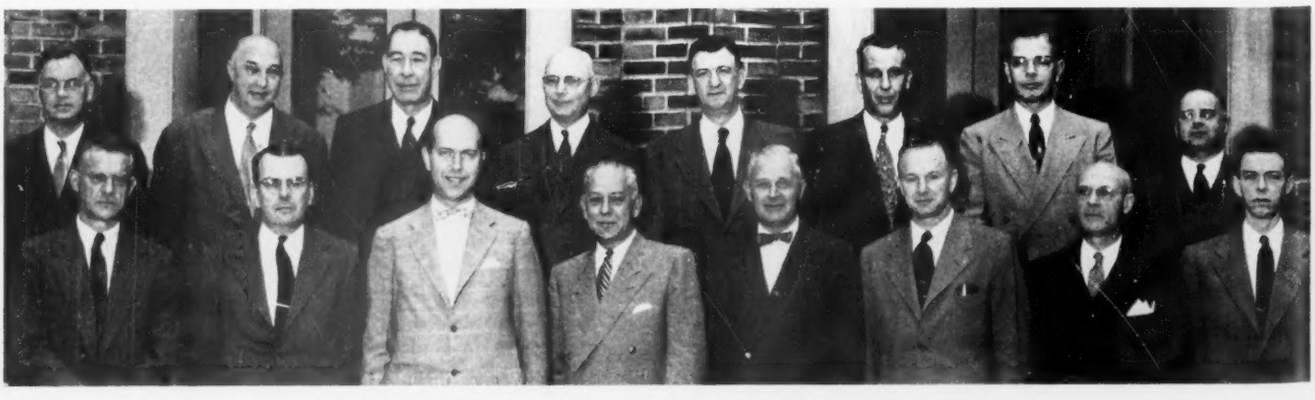
(*Continued on page* 210)

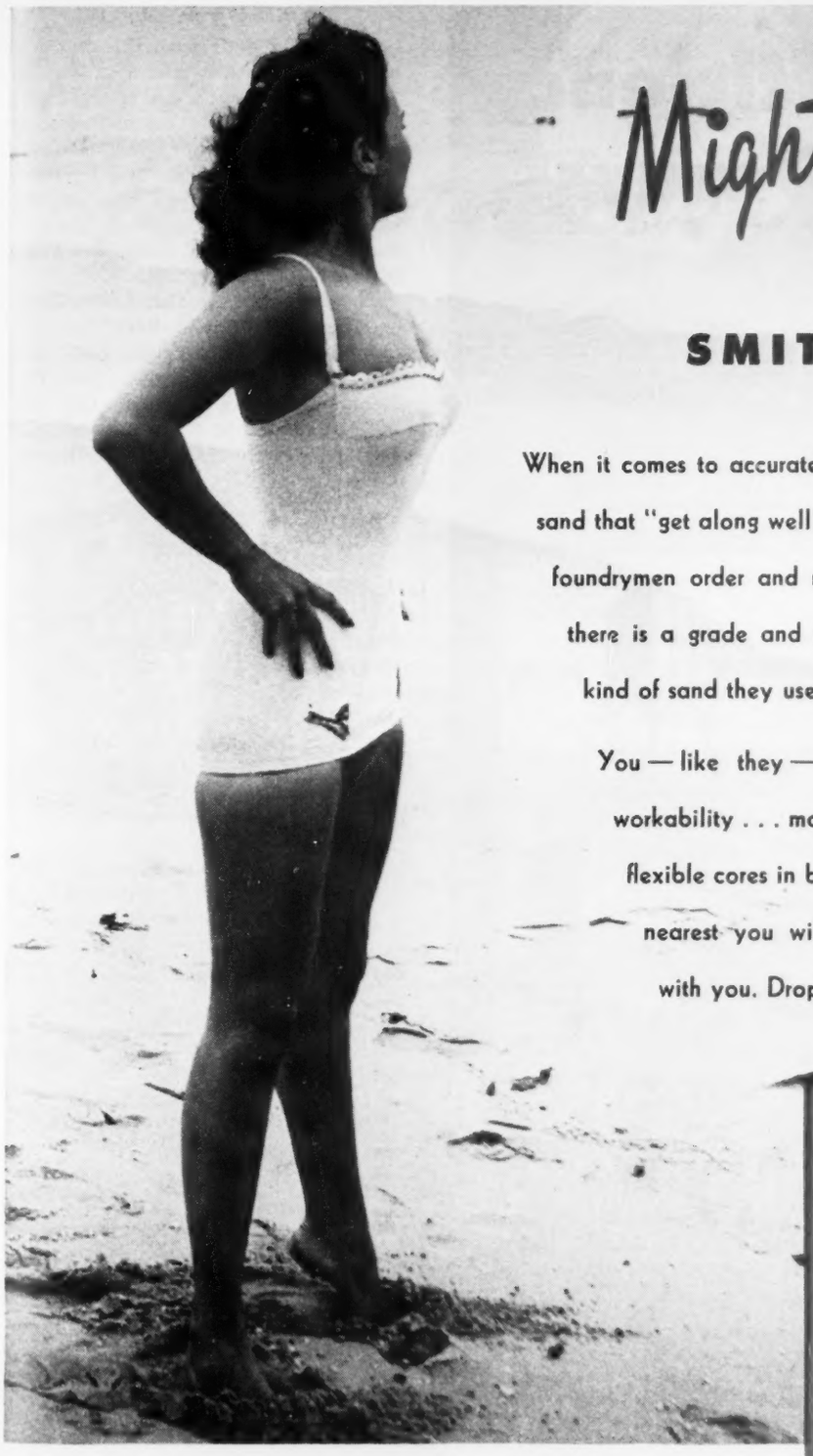
Cornell University FEF Advisory Committee Meets

THE CORNELL University Foundry Educational Foundation Advisory Committee met Oct. 4 in Ithaca, N. Y. Members discussed how to interest more university students in foundry work and increase the percentage of good students entering some branch of the industry after their graduation.

In the front row, left to right, are Hamilton Garnsey Jr., vice president, Gould Pumps Inc., Seneca Falls, N. Y.; Peter E. Kyle, assistant director, School of Chemical and Metallurgical Engineering, Cornell; R. W. Crannell, vice president, Lehigh Foundries Inc., Easton, Pa.; R. P. Brewer, vice president and treasurer, Symington-Gould Corp., Depew, N. Y.; G. S. Diamond, president, Electro Refractories & Abrasives Corp., Buffalo; G. K. Dreher, executive director, Foundry Educational Foundation, Cleveland; A. C. Ross, vice president, Worthington Corp., Buffalo; R. G. Thorpe, assistant professor of metallurgical engineering, Cornell.

In the back row, left to right, are Robert Minnear, foundry superintendent, Ingersoll-Rand Co., Painted Post, N. Y.; R. T. Rycroft, president, Kencroft Malleable Co., Buffalo; Keith Williams, president, Pratt & Letchworth Co., Buffalo; A. B. Norton, Aluminum Co. of America, Pittsburgh; Walter Morton, executive vice president, Anstice Foundries, Rochester, N. Y.; L. C. Gleason, foundry superintendent, Gleason Works, Rochester, N. Y.; George Hodgson, chief metallurgist, Doehler-Jarvis Corp., Batavia, N. Y., and Alfred F. Crone, vice president and general manager, Acme Steel & Malleable Iron Works, Buffalo.





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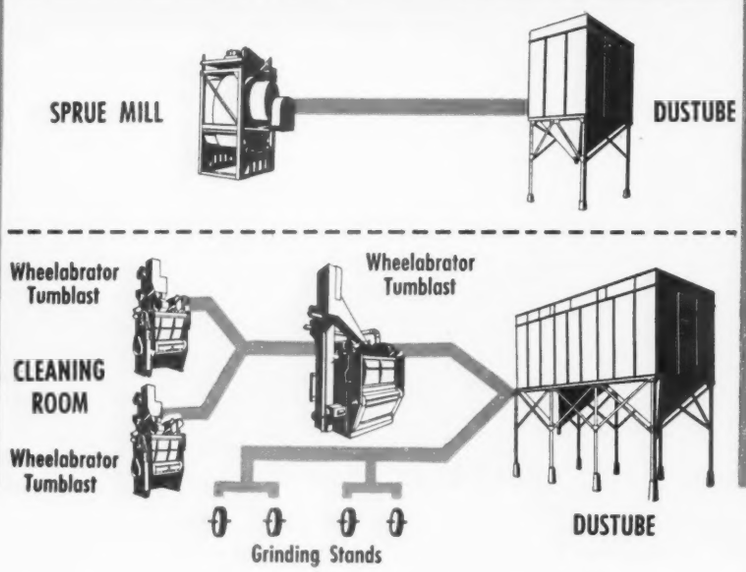

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"The Dustube Collectors have been a profitable investment" says Mr. C. M. Dale, Vice President, "for numerous reasons: (1) Profit margins are greater as the Dustubes cost less to operate and maintain; (2) The Dustubes effectively prevent all dust from permeating the atmosphere making our foundry a better place in which to work; (3) Dust which formerly had been exhausted into the neighborhood is now controlled and collected."

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(*Continued from page* 208)

beneficial to pour with the molds in a horizontal rather than in a vertical position. Shell cores are being blown with sand mixed by the methanol or wet method. When dry mix is blown into the corebox, there is a tendency for sand and resin to separate but with the methanol method, resin is coated on each sand grain and there is no tendency to separate.

It was announced that Lester Bealer, American Brake Shoe Co., the chapter's vice chairman, had been transferred to Dallas, Tex., but Will Delaney, Eureka Foundry Co., has been appointed to fill the vacancy.—*Porter Warner Jr., Porter Warner Industries.*

Pittsburgh

MEETING at Webster Hall Hotel, new meeting place of the Pittsburgh Foundrymen's Association, 125 members and guests heard Ford R. Snyder, metallurgist, Hickman, Williams Co., Chicago, discuss "Controls in Cupola Operations" Oct. 20.

Mr. Snyder believes great benefits can be derived from setting up controls for cupola operation, and alert management will insist on establishing a workable control system. Two steps were outlined. First, control procedures should be set down on paper. Then a system should be devised which will assure no deviation from those procedures. The speaker stated there are three "musts" for any successful cupola control plan. Most important are correct operational targets. These should be posted so that all employees concerned with the cupola will know what they are striving for. Second in importance is a constant flow of immediate information as to character and quality of melts. Hand in hand with these is the third, establishment of prompt remedial procedure in the event of any deviation from the stated goals.

In conclusion, the speaker cited instances where lack of know-how and faulty equipment were responsible for poor metal quality. He also pointed out that proper coke handling and choice of coke are necessary to good cupola operation.—*Robert E. Hall*

Cincinnati District

TO open the current chapter season, Cincinnati District Chapter of the AFS had as its speaker, W. A. Hambley of the Chas. A. Krause Milling Co., Milwaukee. The meeting was held at the Engineering Society building, Cincinnati, and was well attended by foundrymen from the Cincinnati-Dayton-Hamilton area.

(*Concluded on page* 212)

The hard, cold facts about Pittsburgh's hot furnaces!

47 PLANTS OKAY THE HEAT PROVER

Pittsburgh's great steel industry needed an instrument to measure air infiltration, to check air requirement and fuel-air ratio controls in open-hearth furnaces . . . an instrument to check the stoves in which blast-furnace air is heated . . . to check precise atmospheres in soaking pits . . . to control fuel waste and precise atmospheres in processing furnaces.

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These points begin to tell you why Cities Service Heat Prover analyses are just as much favored in glass, ceramics, steam generation and other fields as in the great Pittsburgh steel area. For the full story as it applies to you, write CITIES SERVICE OIL COMPANY, Dept. L41, Sixty Wall Tower, New York City 5.

CITIES SERVICE

(*Concluded from page* 210)

Mr. Hambley's talk was concerned as much with the philosophy of approach to the solution of casting defects as with specific problems encountered. He stressed the economic aspects of both scrap and salvage operations.

The speaker divided casting defects into two broad categories. The first included shifts, short pour, misrun, rough castings, crush, etc., defects whose fundamental nature is discernible and which can be corrected by going back to the source. In the second category Mr. Hambley included blows, pinholes, shrink, bleeders, inclusions, etc., which are holes in castings and whose prevention requires teamwork and analytical thinking on the part of the entire organization. He stressed the idea of teamwork and stated that poor morale in an organization is one of the greatest scrap producers and one which does not even appear in the book.—*David J. Pusack, Cincinnati Milling Machine Co.*

Eastern Canada

MAKE Better Castings" was the title of the talk presented by R. A. Colton and D. L. LaVelle, Federated Metals Division, American Smelting & Refining Co., Barber, N. J., at the Oct. 3 meeting of Eastern Canada Chapter of the AFS.

Mr. Colton explained that they would discuss the problems in the selection of alloys, melting, gates and risers. Mr. LaVelle, speaking on aluminum alloys, stated it is worthwhile to know the service for which a casting is to be used in order to select the proper alloy. For example, alloys are available for pressure-tight castings, others are better for corrosion-resistant castings and some are for castings requiring good machinability.

In melting aluminum alloys, Mr. LaVelle said, simplicity is the main point. Hydrogen gas gives the most trouble and for this reason over-heating should be avoided since the solubility of hydrogen increases with temperature. Care should be taken in storing aluminum alloys and he recommended that they be stored indoors in a dry place. To avoid dross, it was recommended that there be no stirring and great care exercised when transferring the alloy from one ladle to another. For pouring, Mr. LaVelle recommended a small sprue and pouring as close to the mold as possible.

Mr. Colton spoke on selection of alloys for bronze castings, adding that melting should be done as quickly as possible, using an oxidizing flame and deoxidizing before pouring. Excessive stirring is undesirable. For high-leaded bearing bronzes, the speaker pointed out that a reducing flame has proved desirable in some cases. The same care should be exercised in pouring as with aluminum alloys. Mr. LaVelle and Mr. Colton concluded their presentations with suggestions on proper gating and risering, showing on the blackboard right and wrong ways to gate some castings.

Morris McQuiggan, C. & O. Clark Bros., served as technical chairman and A. J. Moore, Montreal Bronze Ltd., presided.—*W. C. Rowe, Crane Ltd.*

Rochester

SHELL molding was discussed by G. N. Etherington, American Brake Shoe Co., Mahwah, N. J., at the Oct. 7 meeting of Rochester Chapter of the AFS. Meeting place was Hotel Seneca, Rochester, N. Y.

Sand grains and resins are of considerable importance in shell mold production, according to Mr. Etherington. Because resins are costly, they must be handled with care. Comparing conventional molding methods with shell molding, 2 to 10 lb of green sand are required to produce 1 lb of metal casting, whereas with shell molding, 2 to 8 lb of castings are produced with 1 lb of sand.

The speaker presented slides illustrating a method of making the molds on inexpensive equipment. Advantages for the process were cited as: Skilled help not required, castings produced with good surface and held to dimensions plus or minus 0.005-in., detail is retained, thin sections can be poured, mechanical operations can be used, molds can be stored and low cleaning cost.

Mr. Etherington included as disadvantages the high initial pattern costs, gating and risering, high cost of resin, limited size of casting, and limited amount of technical knowledge and equipment. However, the process has made rapid strides since its introduction.—*Herbert G. Stellwagen, Hetzler Foundries Inc.*

Reading

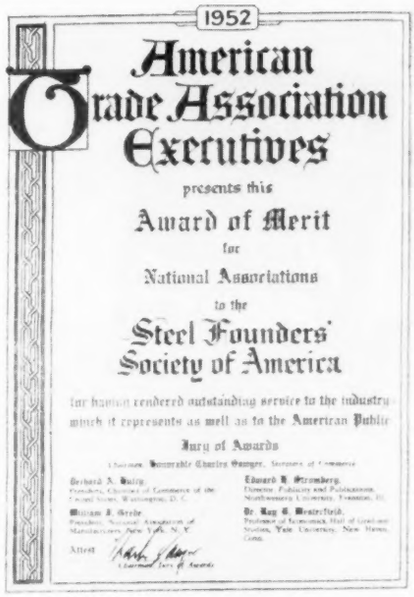
MEETING jointly at the Berkshire Hotel, Reading, Pa., the Reading and Conestoga Foundrymen's Associations had as their speaker John B. Caine, foundry consultant, Cincinnati.

"What Do We Know About Sand in Relation to Foundry Work?" was the title of his talk. Mr. Caine showed a number of slides to illustrate the effect of molten steel on sand and the procedure used to refine and to store it.—*W. I. Cassidy*

Steel Founders' Society Cited for Service

National recognition as winner of the 1952 Award of Merit of the American Trade Association Executives, international society of professional trade association executives, was accorded the Steel Founders' Society of America at the annual meeting of the ATAE in Toronto, Ont.

Citing the society, the ATAE presented the permanent award plaque shown here ". . . for having rendered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for having rendered outstanding service to the industry which it represents as well as to the American Public

Jury of Awards

outstanding service to the industry which it represents as well as to the American public—for its excellent services to its industry and especially for its broad program of varied services to manufacturers of steel castings.

"Among these services," the citation specifies "are technical research in raw materials, products, and uses, current statistics, market surveys to widen the use of steel castings, advertising, public relations, unfair trade practices, and liaison with engineering colleges.

"Recently the association has given special attention to working out the best methods of inducing all members to make complete use of the wealth of research information now available."

Presentation of the award was based on the judgment of a five-man jury of awards of which Commerce Secretary Charles Sawyer was chairman.

Surface Combustion Corp., Toledo 1, O., has moved its Detroit district office to new quarters at 10333 West McNichols Rd., Detroit 21.

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ELECTROMET Data Sheet

A Digest of the Production, Properties, and Uses of Steels and Other Metals

Published by Electro Metallurgical Company, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N. Y. • In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario

How Ladle Inoculants Reduce Chill . . . Produce High-Strength, Machinable Iron

One of the most significant developments in the field of cast iron metallurgy during recent years has been the widespread growth of the process of "inoculation" in producing quality metal to strict specifications. Inoculation has been defined as "a process in which an addition is made to molten cast iron for the purpose of altering or modifying the micro-structure of the iron and thereby improving the mechanical and physical properties to a degree not explainable on the basis of the change in composition."*

Various ladle addition alloys are used for inoculation of cast iron, but there is a wide range in the efficiency and potency of these materials. The 50 per cent and 75 per cent ferrosilicons are mild inoculants, but they are used as ladle additions principally as a means of adjusting the silicon content of cast iron. The 85 per cent and 90 per cent grades of ferrosilicon are much more effective inoculants. Inoculating power is further improved through the use of special inoculating alloys, such as silicon-manganese-zirconium ("SMZ" alloy) and calcium-silicon.

*Definition by H. W. Lownie, Jr.—A.F.S. Symposium on "Inoculation of Gray Cast Iron."

ELECTROMET produces a number of alloys for inoculation, each of which has specific applications. The graphitizing inoculants are:

"SMZ" Alloy	60-65% silicon 5-7% manganese 5-7% zirconium
Calcium-Silicon	30-33% calcium 60-65% silicon
90% Ferrosilicon	92-95% silicon
85% Ferrosilicon	83-88% silicon
Special Graphitizer	A mixture of ferrosilicon and graphite for special uses.
75% Ferrosilicon	73-78% silicon
50% Ferrosilicon	47-51% silicon

These inoculants are usually added to the molten iron as it leaves the cupola spout, or during transfer from one ladle to another.

"SMZ" Alloy—An Efficient Inoculant

The benefits of inoculation are obtained largely as the result of rigid control of the structure of the graphite phase of cast iron which has received this treatment. The results of inoculation on the properties of a typical cast iron are demonstrated by the accompanying illustrations showing the effect of adding various amounts of "SMZ" alloy.

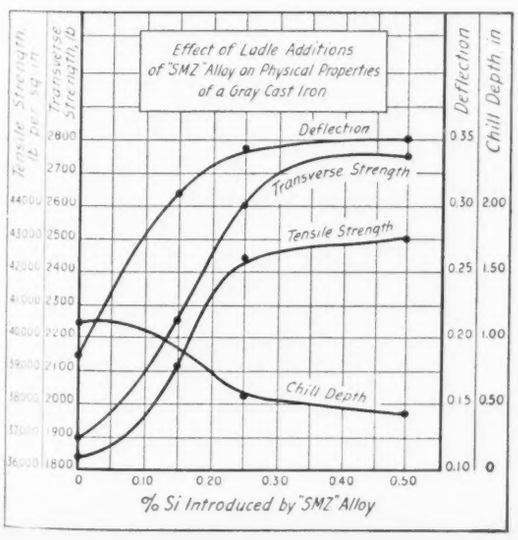
Effect of Ladle Additions of "SMZ" Alloy on Physical Properties of a Gray Cast Iron
Deflection
Transverse Strength
Tensile Strength
Chill Depth
Tensile Strength, lb. per sq. in.
Transverse Strength, lb.
Deflection
Chill Depth, in.
% Si Introduced by "SMZ" Alloy

Fig. 1—These curves show how additions of "SMZ" alloy reduce depth of chill and improve mechanical properties when added to a series of irons selected to give the following final analysis: 3.10 total carbon, 0.60 combined carbon, 1.80 silicon, and 0.50 manganese.

Effects of Inoculation

The effects of graphitizing inoculants are: a drastic decrease in the chilling tendency of a given iron, a mild decrease in Brinell hardness, lowering of the section sensitivity of the metal, a definite increase in tensile strength, and an increase in transverse strength and deflection. These benefits are usually accompanied by improved fluidity, better castability, and improved resistance to wear.

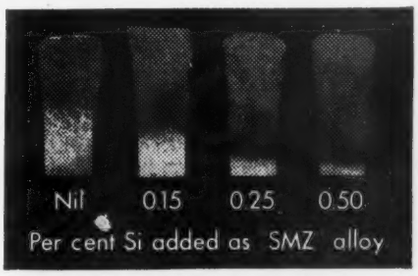

Fig. 2—These chill blocks show how progressive additions of "SMZ" alloy reduce the depth of chill.

New Stabilizing Inoculant

For the production of cast iron, ELECTROMET developed recently a special low-carbon foundry ferrochrome. This silicon-chromium alloy is so balanced in composition that it increases the strength and hardness of gray iron, without increasing chill. The new alloy has a nominal analysis of 30 per cent silicon and 50 per cent chromium. It has excellent solubility in iron, and the inoculating effect of the silicon content makes it possible to add up to 1 per cent chromium to gray iron as a ladle addition, with no appreciable increase in chill. Castings treated with the new alloy have an excellent balance between machinability and good resistance to wear.

Booklets Available

Further information about ladle inoculants is given in the booklets, "SMZ Alloy and Its Uses as a Ladle Addition to Cast Iron" and "Silicon-Chromium Alloy in Complicated Iron Castings." You may obtain copies, free of charge, by writing or phoning to the address given above or to the nearest ELECTROMET office: in Birmingham, Chicago, Cleveland, Detroit, Los Angeles, New York, Pittsburgh, or San Francisco. In Canada: Welland, Ontario.

The terms "EM," "Electromet," and "SMZ" are registered trade-marks of Union Carbide and Carbon Corporation.

ASM Establishes Research And Education Foundation

By unanimous vote of its 22,000 members, the American Society for Metals has transferred from its funds an initial $650,000 for the establishment of a Foundation for Education and Research. Assets of the foundation will provide each year an income of approximately $30,000 to be used for the advancement and dissemination of scientific knowledge, particularly with respect to the technology of metals, for the use and benefit of the public at large, either through education and research carried on by the foundation or through the support of educational and research activities in established organizations and institutions.

Trustees of the Foundation for Education and Research will be past presidents of the ASM, rotating in five-year trusteeships dating from the inauguration of their presidential terms. The initial board of trustees will consist of Dr. Harold K. Work, director of research, College of Engineering, New York University; Dr. Arthur E. Focke, head, materials development, Aircraft Nuclear Propulsion Project, General Electric Co., Cincinnati; Walter E. Jominy, chief metallurgist, research department, Chrysler Corp., Detroit; Dr. John Chipman, head, department of metallurgy, Massachusetts Institute of Technology, and Ralph L. Wilson, director of metallurgy, Steel & Tubes Division, Timken Roller Bearing Co., Canton, O.

Foundry Maintenance To Be Discussed

A conference arrangement designed to permit consideration of the problems of individual plants will be a feature of the Plant Maintenance Conference, Public Auditorium, Cleveland, Jan. 19-22. Every effort will be made to permit each visitor to have his specific questions answered by experts from all major industries.

Panel, conference and roundtable provisions will make possible the treatment of about 5000 individual problems, in addition to the reading of prepared papers and four plant tours. Eight sectional conferences and 21 roundtables will be held over two-day periods to encourage visitors to consider discussions overnight and to submit questions based on their own experiences. The Plant Maintenance Show, to be held at the same time, will include displays of about 300 exhibitors.

Eleven major industries will have sessions of their own to allow intensive discussions of single industry problems. Stephen E. Kelley, assistant general manager, Eberhard Manufacturing Division, Eastern Malleable Iron Co., Cleveland, will head the roundtable which will discuss "Maintenance in Foundries." It will be held at 2 p.m., Tuesday, Jan. 20.

Steel Foundry Foremen's Club Wins Safety Award

The Standard of Excellence Award of the National Association of Foremen has been won by the American Steel Foundries Foremen's Club, American Steel Foundries, East St. Louis, Ill., for the second straight year. Signifying that for every million hours of work there were ten or fewer accidents, the award was made this year to 15 supervisory clubs, but to only four for the second straight time. More than 300 foremen's clubs belong to the National Association of Foremen.

PARASPRAY CORES MOLDS

CORE & MOLD SURFACE CONDITIONER

A fast-drying liquid that is easily applied by spraygun, brush, or dipping. Produces a hard, tough, moistureproof coating unaffected by water, oils, etc. Gives added surface strength to delicate green or baked sand cores and molds, preventing "washes" and handling damage. Produces smoother castings and eliminates cope gas porosity.

PARACOAT FOR PATTERNS

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A glossy, hard, tough, moistureproof pattern coating that gives superior performance. Available in clear and all standard A.F.A. (and many other) colors. The ideal coating for long life pattern protection. Dries faster and is better and cheaper than shellac which it outlasts 10 to 50 times.

BONISPRAY PERMANENT MOLDS

PERMANENT MOLD & DIE DRESSING

A special paste (sprayable when thinned with water) developed by an eminent scientist. Widely used as a coating for permanent molds and dies, and in centrifugal casting. Now further improved to outlast any dressing of its kind. Ideal for coating ladles, pots, goosenecks, nozzles, pins, etc. Prevents sticking of metal and dross.

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Also ask about PARASOLV for thinning and cleaning purposes and ANTI-FLAME, a low-priced, easy-to-use product for flameproofing wooden flasks, bottom boards, work clothes, etc.

Para Products Have A Place in Every Foundry

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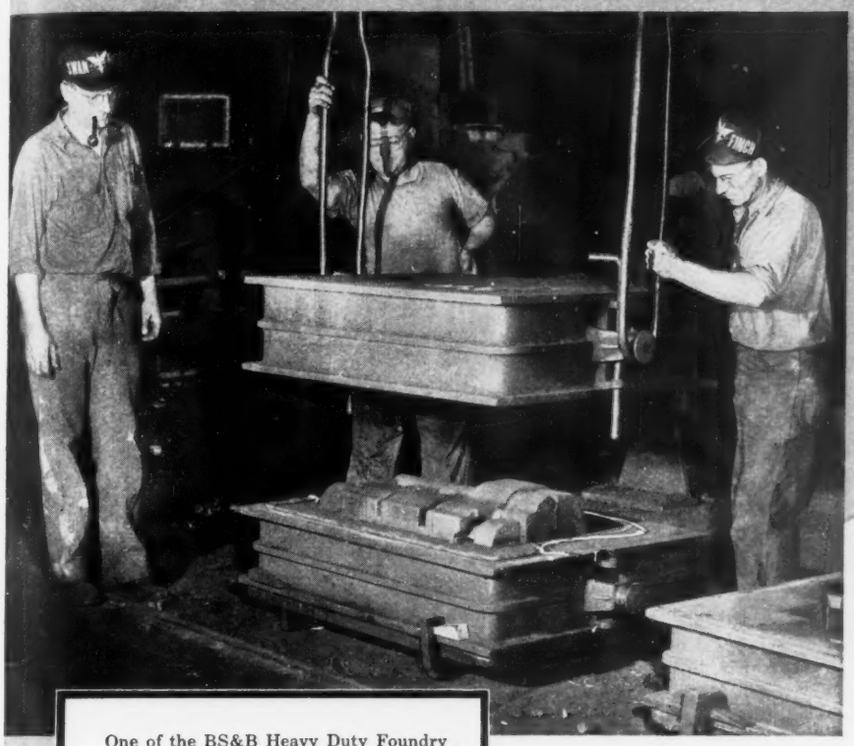

Tells Why They RE-ORDERED BS&B FOUNDRY FLASKS!

One of the BS&B Heavy Duty Foundry Flasks in use at the Gisholt Machine Co. This company is one of the prominent manufacturers of machine tools and balancing equipment in the United States. As part of their operation they maintain a well organized and mechanized foundry. They make castings for all different types of machine tools including turret lathes, automatic lathes, balancing and super finishing machines.

Low Maintenance Cost Important To This Type of Foundry

"We are anxious to get our next shipment of BS&B Foundry Flasks" says Arnold Salg, Foundry Superintendent of the Gisholt Machine Co. He adds: "they're serviceable and well constructed. The low maintenance cost on BS&B Heavy Duty Foundry Flasks is a very important angle to a foundry of our type."

Here's a relatively new customer for BS&B Foundry Flasks in a comparatively new area for BS&B. Handling heavy castings soon proves the serviceability of a flask. And Gisholt is convinced that BS&B is the best choice for the long-run operation.

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A handy catalog and useful foundryman's "bible"... includes easy-to-order system.

Why?

Because BS&B Heavy Duty Foundry Flasks are the only heavy duty flasks combining all these advantages:

1. Welding of bearing strips continuously, both inside and out;
2. Cast steel trunnions;
3. Cast steel pinlugs and clamplugs.

BS&B Foundry Flasks have proved their worth and serviceability time and time again... which is why BS&B has so many well known and long time customers. BS&B flasks are designed by foundrymen . . . built to your particular specifications.

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MICHIGAN REGIONAL CONFERENCE

Attracts Nearly 400 to Ann Arbor

By EDWIN BREMER and HOWARD C. TUTTLE
FOUNDRY

NEARLY 400 attended the annual Michigan Regional Foundry Conference held at the University of Michigan, Ann Arbor, Mich., Oct. 17 and 18, under the sponsorship of the university, Michigan State College, and Saginaw Valley, Western Michigan, Central Michigan and Detroit chapter of the American Foundrymen's Society.

Opening session Friday morning was presided over by Prof. R. A. Flinn, University of Michigan. Those in attendance were welcomed by Dean George G. Brown, University of Michigan.

First technical session under the direction of David Boyd, Engineering Castings Co., Marshall, Mich., and John F. Smith, Chevrolet Gray Iron Foundry Division, General Motors Corp., Saginaw, Mich., dealt with precision molding methods. First speaker, W. S. Pellini, Naval Research Laboratory, Washington, discussed "Solidification of Metals in Sand Molds." He pointed out that in the progressive solidification of an alloy from a sand mold wall there may exist a completely liquid zone, a mushy zone of solid dendrites with liquid metal at the dendrite interstices, and a completely solid zone. Depending upon the type of alloy, mold material and stage of solidification, at least two and often three of those zones exist concurrently. Nature and development of the mushy regions in a casting are extremely important to ultimate soundness.

Describes Shell Molding

Prof. R. A. Flinn, pinch-hitting in absence of H. L. Day, Auto Specialties Mfg. Co., St. Joseph, Mich., gave a brief description of shell molding as applied to ferrous castings, and practiced at Auto Specialties. He said that there is no simple method of comparing cost of shell molding with other methods. Essential figure is that of the casting finished and ready for use, and in many cases shell molding appears advantageous due to such factors as reduced scrap, simpler shakeout, lower cleaning cost, close dimensional tolerance, etc. However, cost of resin and equipment is high.

At the luncheon Friday noon Prof. Charles Sigerfoos, Michigan State College, East Lansing, Mich., presided. Collins Carter, Albion Malleable Iron Co., Albion, Mich., and national vice president of the American Foundrymen's Society, described the various activities of the society and the services available to members. W. N. Davis, AFS, Chicago, discussed plans of the Safety, Hygiene and Air Pollution section of the society with particular reference to its safety training program for foremen and supervisors which made its debut in November at Chicago. George Dreher, Foundry Educational Foundation, Cleveland, reviewed the progress of the foundation since its inception in 1947.

In the afternoon sessions on cupola practice and nonferrous practice were held. Chairmen of the cupola meeting were Fred J. Walls, International Nickel Co., Detroit, and A. W. Demmler, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.

Frank Rote, Albion Malleable Iron Co., Albion, Mich., described cupola practice in combination with the air furnace to produce malleable iron. Two cupolas, one with cold and the other with hot blast, feed into a 60-ton oil-fired air furnace. Cupola metal charges consist of about 1550 lb steel scrap, 1080 lb hard iron sprue, 270 lb silvery pig, 100 lb malleable scrap, with sufficient ferrosilicon to produce an iron over the spout containing 1.58 to 1.68 per cent Si and 2.50 to 2.60 per cent TC. Refining in air furnace reduces TC 0.18 to 0.20 per cent with little change in Si, Mn, and P, but with an increase in S. Close control of temperature and TC are maintained in the cupola, and 3 x 4 in. coke is found to give slightly lower TC than larger size coke.

W. W. Levi, Lynchburg Foundry Co., Radford, Va., discussed basic cupola operation as practiced by his firm. Cupola, lined to about 72 in., has water-cooled melting zone and tuyeres. The latter extend about 5 to 6 in. beyond the lining, and are made of copper. Externally heated air blast also is used. Mr. Levi stated that the basic-lined cupola is excellent for producing low S, high TC irons from metal charges containing up to 100 per cent steel scrap. Such irons are well suited for production of spheroidal cast iron, and for castings in which high TC is desirable. Basic-lined cupolas also may be used where there is a large price differential between steel scrap and pig iron and it is desired to produce a low S-low-P iron.

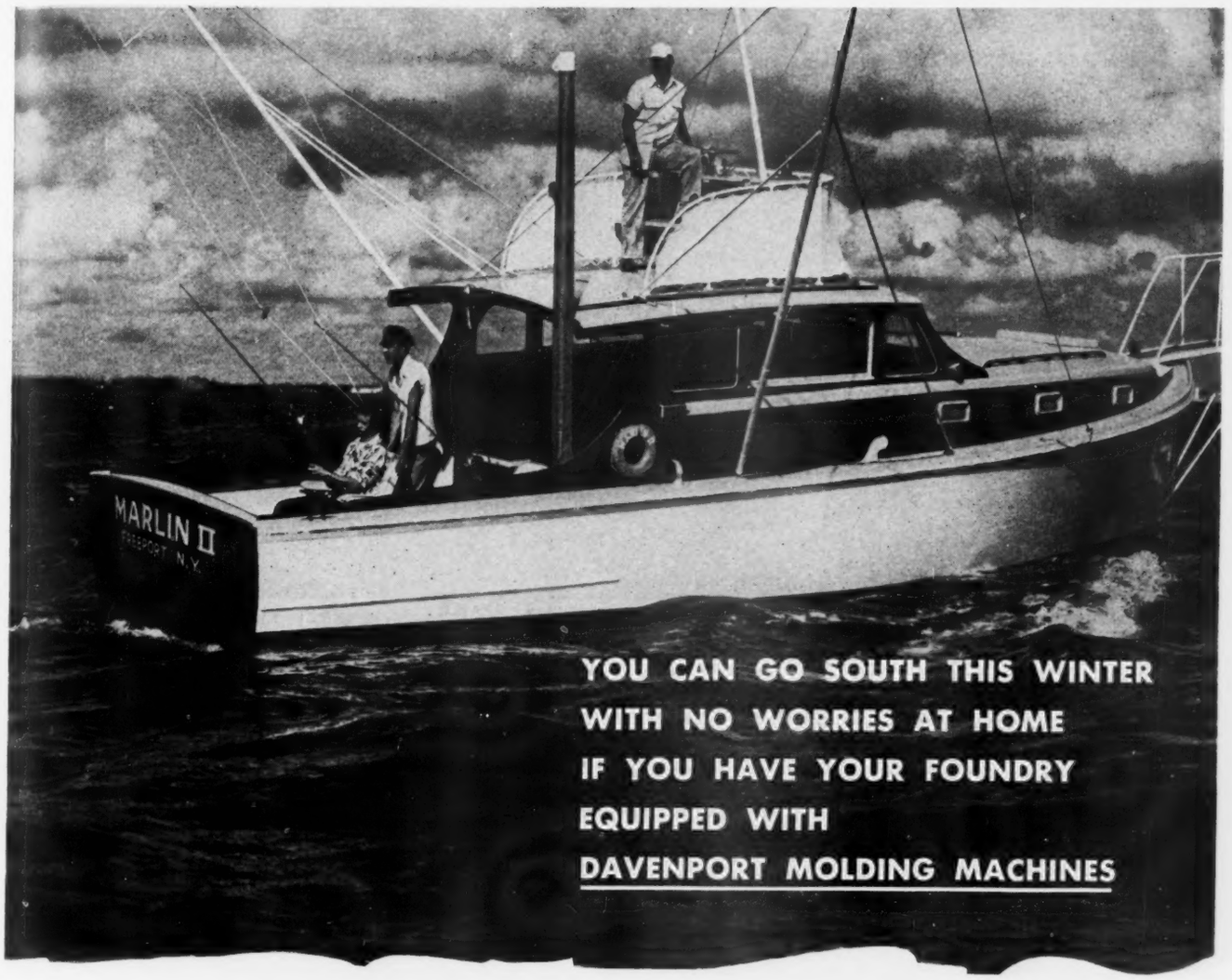
Howard Wilder, Vanadium Corp. of America, Detroit, spoke on acid cupola operations. He pointed out that this type of cupola is most widely in use, possesses considerable flexibility, is easy to operate and with reasonable care in operation produces quality iron. He presented a number of charts to show the wide variations in amount of coke in the splits, size of metal charges, quantity of air, tuyere area, melting rate, etc., and mentioned that despite the non-uniformity, all cupolas included in the survey functioned satisfactorily, and produced the desired quality of iron over the spout.

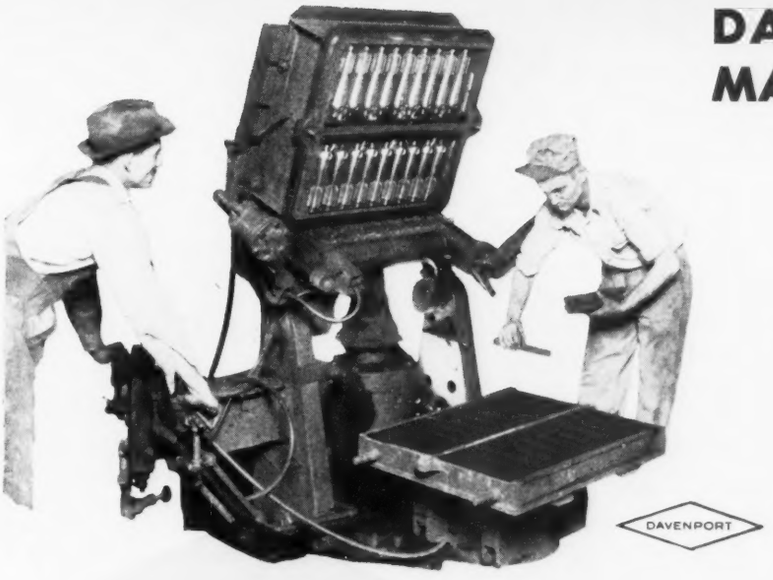
Discuss Nonferrous Problems

Problems in nonferrous foundry practices were discussed in another session co-chairmanned by Crary Davis, Centr-O-Cast & Engineering Co., Detroit, and Ernest Frens, Michigan State College. Effects of melting and pouring procedures on copper-base alloy castings were described by John Kura, Battelle Memorial Institute, Columbus, O., who told of tests in which calcined clay molds were used. These molds eliminated a variable and showed only effects of changes in melting and pouring practices. It was discovered that porosity in a casting might be caused by melting under reducing conditions. Eliminating the cover while melting was suggested. Tensile properties of castings improperly poured were erratic, he noted. It is important that the lip of the ladle be close to the mold and that the sprues be kept full at all times. Citing tests using green sand molds, he reported that a low pouring temperature results in less gas formation in both high and low quality melts.

Problems with aluminum alloys were discussed by Charles B. Maxwell, Christiansen Corp., Chicago, who mentioned that many of the points made by Mr. Kura also apply to aluminum. The aluminum foundryman's No. 1 problem, he said, is hydrogen pickup. Showing slides of various types of furnaces, he noted that the induction furnace makes a high quality melt because there is no flame to come into contact with the melt. In melting aluminum alloys containing Mg, temperature must be watched closely since Mg can be lost easily and its absence will not be discovered until heat treatment is tried. When

(*Continued on page* 219)





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Here, for example, is illustrated a simple machine set-up that permits fast, accurate riser cutting. Using an Airco Radiagraph, the casting — measuring 105″ in diameter and 5″ in thickness — is trimmed at a speed of 5″ per minute. More important, the Radiagraph cuts so close to final machining specifications that slow expensive machine work or grinding is eliminated, and a costly production bottleneck is done away with.

This actual case history demonstrates the advantages of removing gates and risers by machine gas cutting. Airco gas cutting machines are easily adaptable to any cutting requirements — straight line, circle, or bevel-edge cuts.

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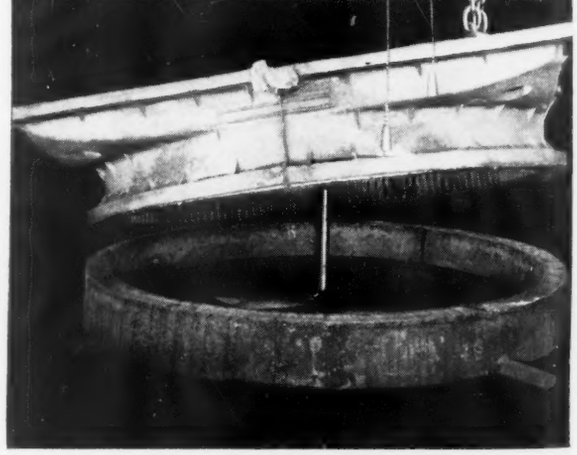

Top photograph shows the simple set-up that makes easy work of a tough job. Above you see the clean, accurate cut, ready for machining.

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(*Continued from page* 216)

this has happened the casting will not heat treat, no matter what is tried. Mentioning pouring at the lowest practical temperature, as a means of getting smaller grain size, Mr. Maxwell added that such things as wall thickness and casting design must be considered in determining that temperature.

Manley Brooks, Dow Chemical Co., Bay City, Mich., described the sand foundry aspects of magnesium alloy casting and reiterated some of the reasons for hydrogen removal given by previous speakers. Best way to refine magnesium that Dow has found, according to Mr. Brooks, is by chlorination. Describing some of the safety-first precautions necessary for magnesium handling, Mr. Brooks said it is necessary to inspect crucibles often for iron scale. He suggested that this be done after the first pour on each shift. This also applies to the Mg-Al-Zn alloy series. "Beware of turbulent flow into the steel-wool screen", he cautioned. Particular attention should be paid to grinding operations. Mentioning design, he asserted that great difficulty will be encountered with wall sections less than 3/16-in. thick.

To Resist Encroachment

Friday evening the group adjourned to the Washtenaw country club for the annual dinner over which Harry E. Gravlin, Ford Motor Co., Dearborn, Mich., presided. Speaker was Paul Bagwell, Michigan State College, East Lansing, Mich., who pointed out that our democratic form of life is being encroached upon more and more, and it behooves us to beware of our feeling of superiority and tendency to depend upon a paternalistic form of government.

On Saturday morning three sessions were held; two simultaneously and a joint closing meeting. At a session on nodular iron over which Gosta Vennerholm, Ford Motor Co., Dearborn, Mich., and John P. Rowe, University of Michigan, presided, Don J. Reese, International Nickel Co. Inc., New York, stated that about 200 foundry firms in over 20 countries are producing spheroidal cast iron. Output has increased from 3500 tons in 1949 to an expected 80,000 to 100,000 tons for this year. Castings in this material range from a few ounces in weight to 50-ton anvil blocks. Physical properties will depend upon the matrix structure which, by adjustment of composition, may range from ferritic to acicular. Ferritic structures show lower strength and higher ductility while the acicular type has

(*Continued on page* 222)

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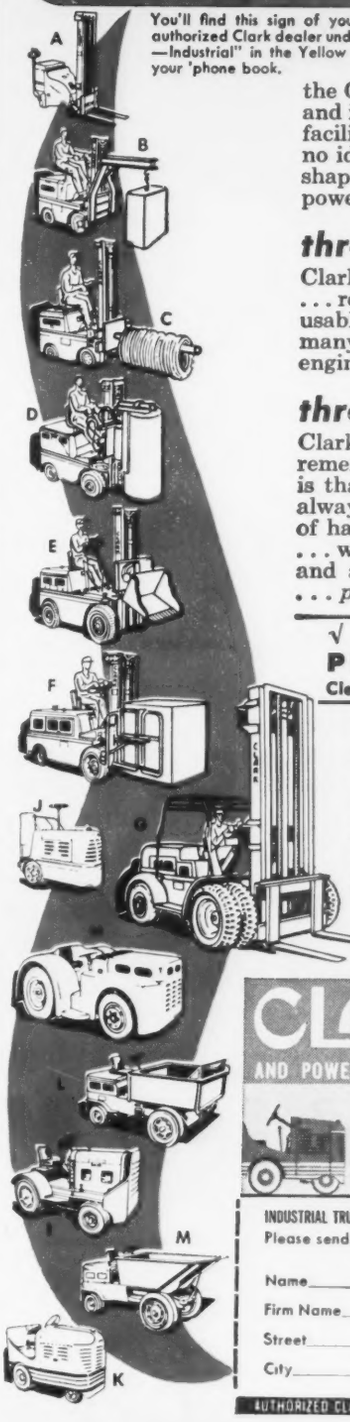
You'll find this sign of your nearby authorized Clark dealer under "Trucks'—Industrial" in the Yellow Pages of your 'phone book.



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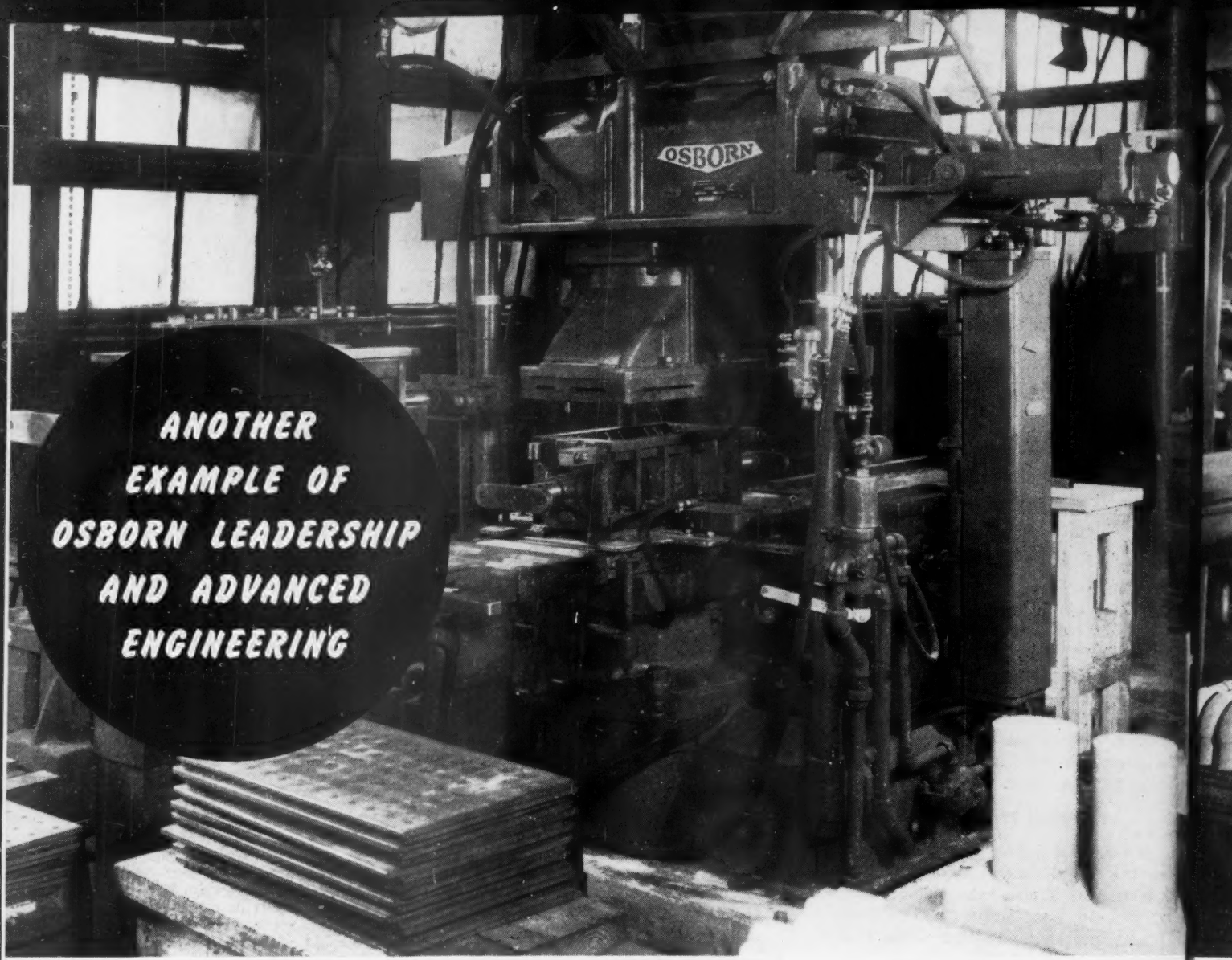

Osborn Draw-type Core Blower with automatic controls and core box locator, and rollers on the table.

Get more cores at less cost with OSBORN CORE BLOWING MACHINES

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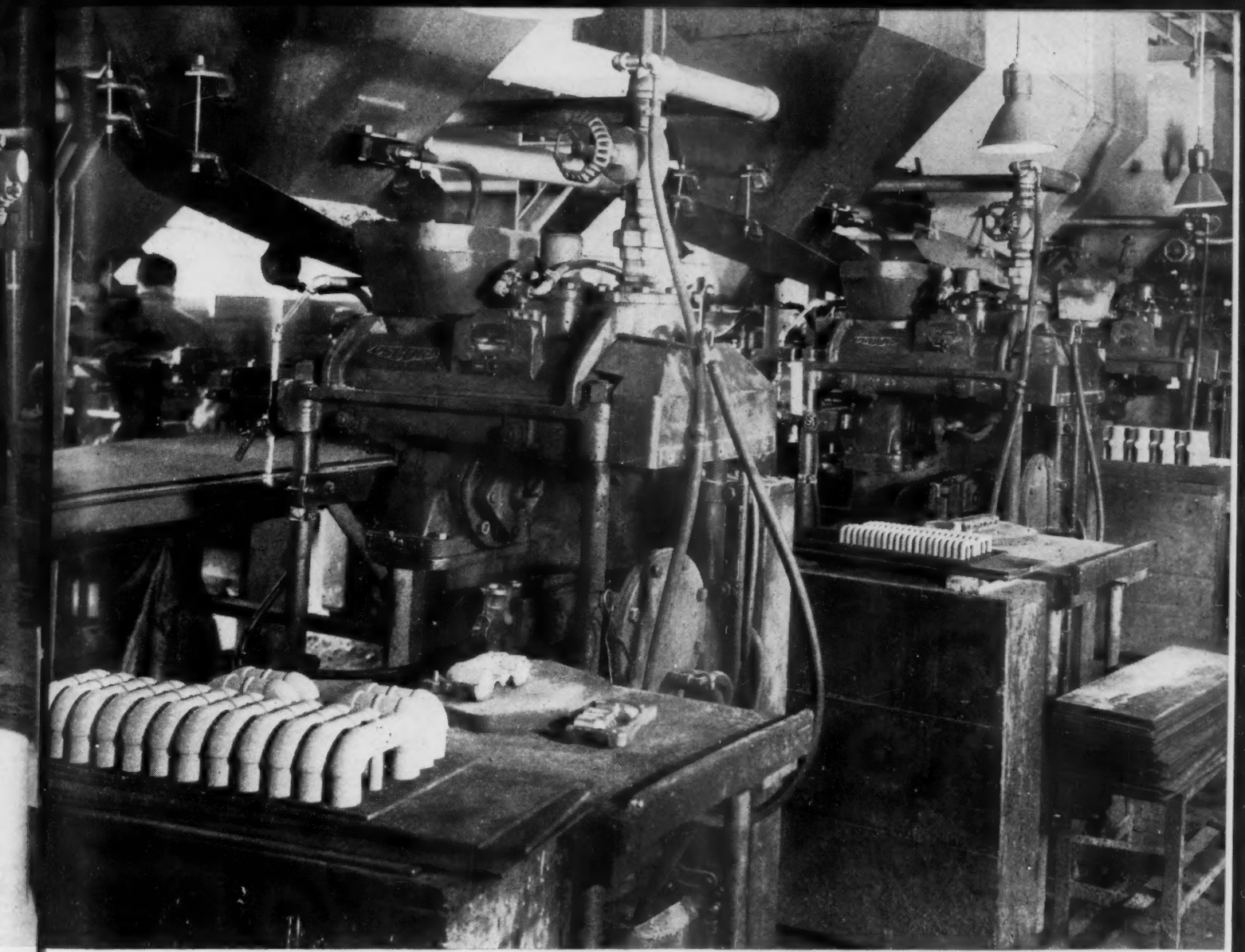

Osborn Diaphragm-type Core Blower with automatic controls, horizontal clamps, and core box ejector.

OSBORN has the right size and type of core blowing machine for every core blowing job. Both diaphragm and draw-type machines can be furnished with automatic controls to operate on preset time cycles. Osborn Core Blowers can be furnished complete with such accessory equipment as horizontal clamps for vertically parted core boxes, rollers on the table for ease in handling large core boxes, core box locators, and core box ejectors to suit individual job requirements. A wide range of sizes of interchangeable sand reservoirs and blow plates are stocked for all model machines.

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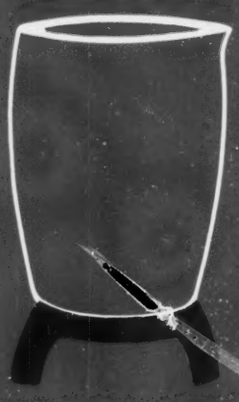
FIRE BRICK?

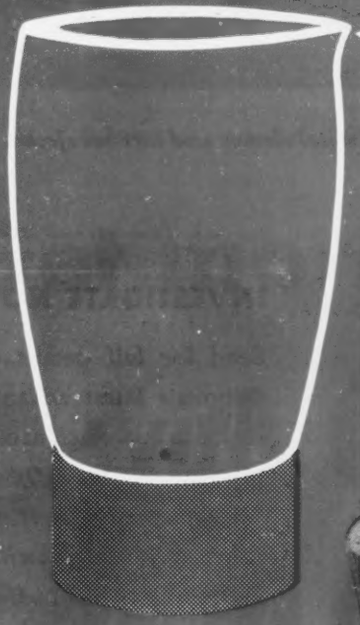
Insulates crucible bottom, breaks up the continuous flow of combustion gases, causes uneven heating, shortens crucible life.



OLD CRUCIBLE BOTTOMS?

Provide uneven seating. The dead air space insulates the bottom of crucible, causes faulty heat distribution, shortens crucible life.

DON'T SAVE PENNIES ON MAKESHIFT BASES AND LOSE DOLLARS ON CRUCIBLES AND FURNACE INEFFICIENCY



STARRBIDE BASE BLOCKS

Designed to fit the crucible. Made of the same material as the crucible, Starrbide Bases get heat to the crucible bottom and direct the flow of gases around the crucible for even heating without strains.

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ALSO MAKERS OF FAMOUS STARRBIDE CARBON-BONDED CRUCIBLES, GRAPHITE CRUCIBLES AND SUPER REFRACTORIES.

(*Continued from page* 219)

high strength and lower ductility.

Thomas E. Eagan, Cooper-Bessemer Corp., Grove City, Pa., said that last year his firm produced 1800 tons of spheroidal iron castings and about 1000 tons in 9 months this year. These varied from 1 to 12,000 lb in weight. Composition showed 3.40 to 3.80 per cent TC, 2.40 to 3.00 per cent Si, 0.40 per cent max Mn, 0.10 per cent P, 0.01 per cent S max., 0.5 to 2.0 per cent Ni, 0.06 to 0.08 per cent Mg, and 0.15 to 0.75 per cent Cu. The latter was not desired, but usually unavoidable. Mr. Eagan stated that when the Mg content dropped below 0.045 per cent, flake graphite appeared; when Mg was over 0.075 per cent, quasi-flake graphite occurred. Manganese acts as a carbide stabilizer so it was held to 0.40 per cent max., and while phosphorus did not affect spheroidization, it did affect elongation so it was kept low.

Must Skim Off Slag

Mr. Eagan pointed out that fluidity of this type of iron is the same as for gray iron, and while it has a greater shrinkage, it is less than that of steel. The large volume of slag formed in sulphur removal by Mg must be skimmed carefully to prevent being carried into the mold cavity and form what is termed "cope defect." Sand must be worked dry to eliminate pinhole or surface porosity. Physical properties determined on 225 heats using the 3-in. Y-block, heat treated, showed tensile strengths from 53,900 to 83,900 psi, yield strengths from 43,300 to 63,800 psi, and elongations from 4.5 to 25 per cent. Impact strength determined by the izod test showed 50 to 90 ft lb in the as-cast condition, and over 120 ft lb in the annealed or heat treated state. Material has good endurance limit and notched-fatigue property as well as resistance to growth under heat.

One of the other Saturday morning sessions was devoted to "Flow of Metals," and had as co-chairmen Prof. Charles Sigerfoos, Michigan State College, East Lansing, Mich., and George T. Baebler, S. H. Cleland & Associates, Detroit. Explaining the purpose of the AFS-sponsored study of metal flow at Battelle Memorial Institute was Robert F. Thomson, General Motors Research Laboratories Division, Detroit. Wrapping up conclusions of two previous motion pictures, the present one deals primarily with the effect of sprue base design on air entrapment in the fluid. It also covers size and design of the runners. At the base of the sprue a circular

(*Concluded on page* 224)

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American MonoRail Engineers can show you how to get more profitable production out of your plant by systematizing material handling. Let them show you how to convert lost ceiling space to profit—how to eliminate obstructive storage around machines—lessen worker fatigue—reduce heavy load accidents—stop damage to product in motion.

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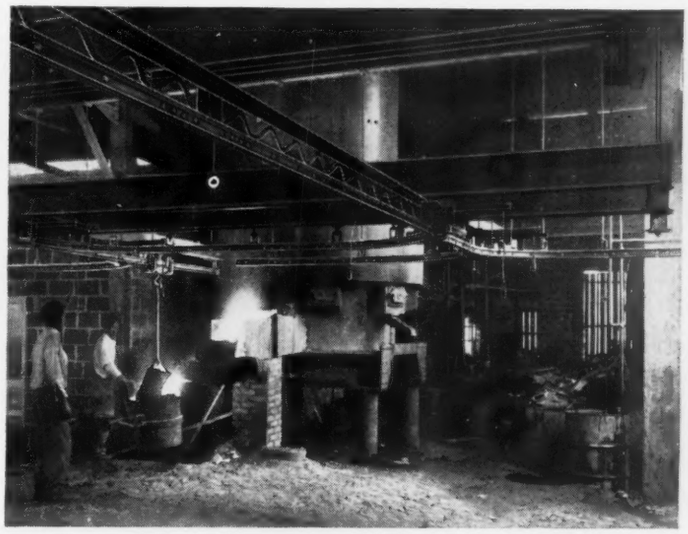

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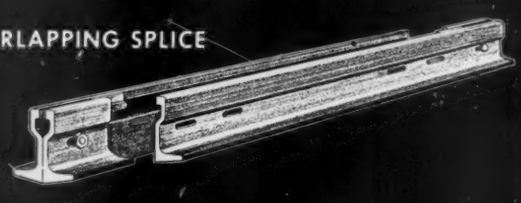
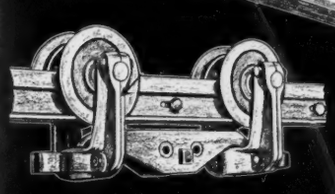
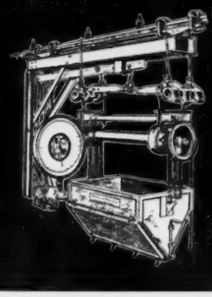




TWO PIECE FORGED YOKES



SCALE HOIST CARRIER

FREE MOVING CRANES

(*Concluded from page* 222)

enlargement with a deep well is shown to be the most effective design. Its

If mold design precludes use of the deep well, an enlargement at the sprue base and use of narrow deep runners are second best.

Winding up the two-day program was an explanation of the methods used to co-ordinate foundry activities in General Motors Corp. Speaker was Bruce A. Smith, who as a member of the production engineering section, manufacturing staff, serves on a number of standing committees in the corporation. He was introduced by Harry W. Dietert, Harry W. Dietert Co., Detroit. GM, said Mr. Smith, operates in a somewhat paradoxical fashion. Each of its decentralized units competes with the others while simultaneously co-operating to a high degree. This co-operation is obtained and the work co-ordinated through 14 standing committees. One of these, the foundry committee, consists of all the foundry managers in the organization who meet at intervals of three to six months. Between meetings several means are provided for interchange of ideas and information. A clearing house operates so that information gathered from contact with the various foundry facilities, technical societies, technical publications, etc., can be fed out to all plants. A monthly publication *Industrial Trends* is circulated internally to tell of new developments.

German Foundry Association Holds Annual Meeting

This view shows some of the more than 1300 foundrymen from 14 nations who attended the 43rd general meeting of the Association of German Foundrymen in Dusseldorf, Germany, Sept. 25 to Sept. 27

THE 43rd annual meeting of the Association of German Foundrymen was held Sept. 25-27 in Dusseldorf, where the association has its headquarters. More than 1300 foundrymen attended, including over 60 from Austria, Belgium, China, Denmark, England, France, Holland, Italy, Norway, the Saar, Switzerland, Sweden and the U. S. A.

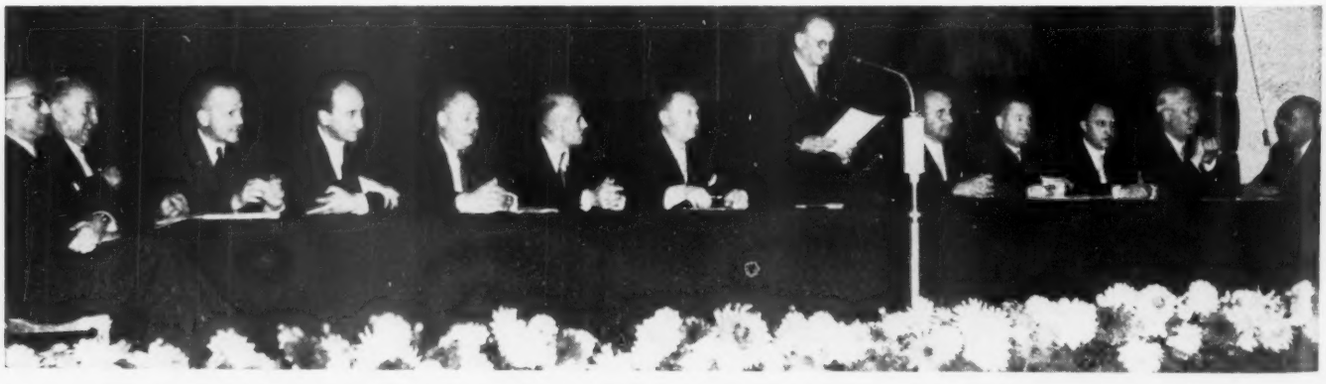
Representatives of foreign foundry associations who attended were H. Baehr and G. Henon, France; R. Doat, Belgium; V. C. Faulkner, England; H. Hertlein, Austria; E. O. Lissell, Sweden; Comm. M. Oliva, Italy; Prof. Ove Hoff, Denmark; E. Schmitt, the Saar; and Prof. John Wulff, U. S. A.

An extensive program included the reading of 13 papers; the showing of "Tapping Techniques and Testing Quality," an American-made film in color; and a dinner party on Sept. 26.

The question of the cultural importance of technology and its place in modern life excited considerable interest at the meeting. Papers on "Cultural Heritage and Creative Power in the World of Technology" and "Contributions of Founders to Monuments of Technology," respectively by Prof. H. Deckert, Hanover, and H. Jungblut, Remscheid, were indicative of that interest. In addition, it was recommended to the assemblage that it aid in the reconstruction of the German Museum at Munich. Prof. Zenneck, head of the museum, made a personal appearance, and a collection was made by the office of the association.

Other papers presented were "Heat Balance in the Hot and Cold Blast Cupola," by W. Paterson, Aachen; "Technical and Economic Problems in the Production and Use of Foundry Coke," by H. Wubberhorst, Essen; "The Influence of Pig Iron and Scrap on the Quality of Malleable Cast Iron," by H. Siegel, Hagen; "Casting of Pig Iron on a Pig Casting Machine," by J. Willems, Duisburg; "Desulphurizing Cast Iron by the Lime-Coal Procedure," by K. Roesch, Remscheid; "Comparison of Basic and Acid Cupola Costs," by H. Schmidt, Coblenz - Metternich; "Using the Compressed Air Gun for Lining and Patching Cupolas," by K. Kramer, Brebach, the Saar; "Sidelights from a Study Trip to America," by E. Hugo, Dusseldorf; "The Laboratory, Its Arrangement, Its Techniques and Its Place in the Foundry Industry," by H. Pieper, Frankenthal/Pfalz; and "Does Rational Thought Require Capital?" by H. Krippendorff, Dusseldorf.

Editor's Note: This report and photos by courtesy of Dr. E. Hugo, director of the German Foundry Association.



President J. J. Kuster of the Association of German Foundrymen, standing, addresses the meeting

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Adventures of BILL

By PAT DWYER
Illustrations by RICHEY

SAY," Bill said the other night, "did you ever hear of a lad named Lick, first name James? Like Old Uncle Ned in the song of the same name, he flourished many long years ago. He was not a native son, but he cut quite a swath across California history in the years following the gold rush of '49."

"Well," I admitted cautiously, "I did not know him well enough to address him as Jim or Jimmy, if that is what you mean. One of the reasons I did not address him as Jim is that he died in the year 1876 and—this is confidential—I was a backward child and hadn't learned a word of English at that time. However, if it will take a load off your mind, I am willing to admit I am familiar with the name and to some extent with the history. If I may make so bold, kind sir she said, what prompted the inquiry of present day and date?"

"I had a letter the other day from an old friend, P. D. Forbes, who lives in Oakland, Calif. He is a genuine blown-in-the-bottle, old time patternmaker, now retired. That gives him a chance to prowl around museums and other places of interest. Recently he spent some time in the Lick Museum in San Francisco. As one old pal to another he sent me an interesting story on the life and adventures of James Lick. In his active career P. D. was a master craftsman in the patternmaking line. If you will be kind enough to do me the favor of bending one of your long hairy ears in this direction, you will note he also is a very handy lad with a pen. All set? Here she comes!"

James Lick was born Aug. 26, 1796 in a small settlement at that time known as Sumptown but later changed to Fredericksburg, Pa. He was the son of John H. Lick, or, as he spelled it, Luk, a German immigrant, a woodworker of unusual skill and ability. The boy served an apprenticeship with his father and acquired a love for fine wood that remained with him all through life. He also fell in love with the local miller's daughter. Since he never married we may assume this love also was fairly permanent. The girl's father objected violently to an ordinary workman aspiring to his daughter's hand.

Young Lick left the old home in 1819 several months after the miller's daughter became the mother of a baby born July 31, 1818. He — that is, the father of the baby — worked at his trade for short periods in Baltimore and New York. In New York he worked for a famous organ maker of that period. Prowling around the water front one day he saw a ship loading furniture for South America. He promptly signed on as a member of the crew, and arrived safe and sound in Buenos Aires some time in December, 1820. He settled down and began what eventually became his ruling ambition, collecting money.

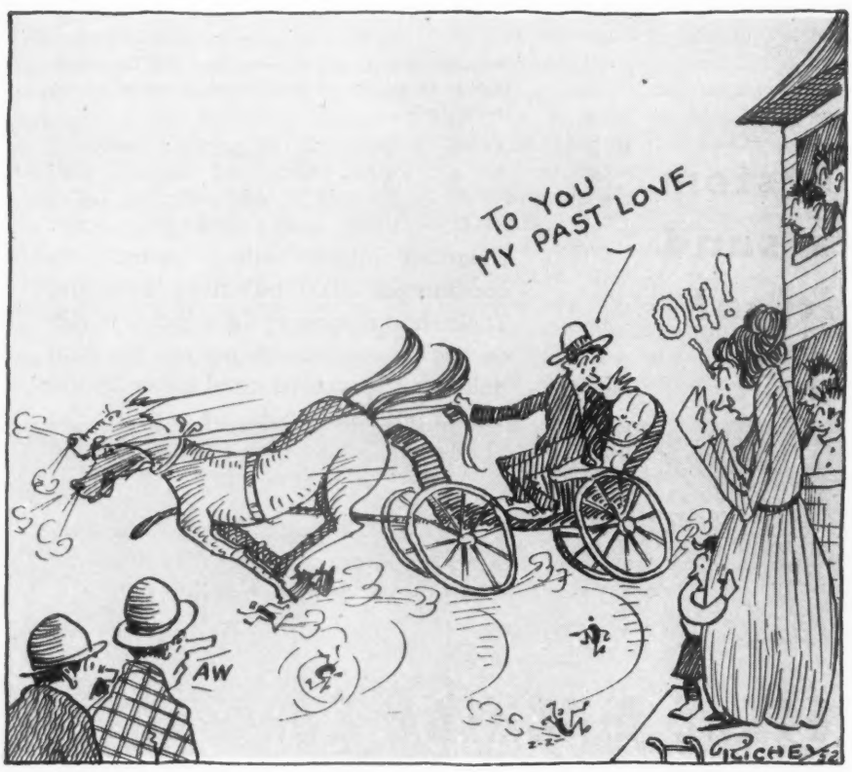
In 1832 he returned to New York, this time a first-cabin passenger, with a load of hides, skins, horns and other South American products. He organized a sale and realized a handsome profit which—added to what he already had—gave him a total bank balance of $40,000. Flushed with victory, he bought an elegant carriage and a matched pair of thoroughbred horses and drove to Sumptown with full intention to claim the miller's daughter and carry her off to his castle. To his dismay, he found that the lady was married and the mother of several little companions for—shall we say—the original No. 1. Our hero pivoted the horses on their hind feet, made a long nose at you know who and lashed his team to a dead run all the way back to New York. He sold the carriage and horses at a reasonable advance over the original cost and headed for South America.

Back in South America he decided that Peru offered the most fertile field for cultivation in this favored land. He remained for over 20 years and skimmed quite a sizable volume of cream out of the financial dairy. Then he pulled up stakes and headed for his native land after he learned that Mexico had ceded California to the United States. In 1848, Jan. 7 to be exact, he landed on the Embarcadero in the thriving young city of San Francisco, 17 days before the discovery of gold in them thar hills precipitated one of the greatest gold rushes in history.

Canny James did not rush off to the diggin's. With ample resources he started to buy land in all directions and in price down to $17 per lot. He bought thousands of acres in the vicinity of San Jose, not with the object of holding it but merely long enough to enable him to sell at a greatly advanced price. In 1855 at the age of 59 he was recognized as one of the wealthiest men in the country.

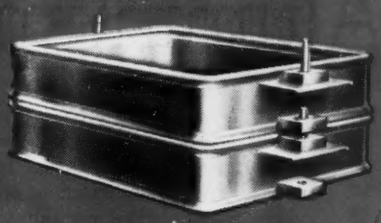
Near San Jose he built a mill to justify a boast he had made to the Pennsylvania miller who had refused him his daughter's hand in honorable wedlock. The young man's offer to do right by our Nell was haughtily

(*Continued on page* 229)

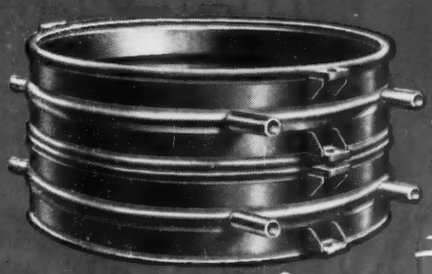


Since she would not fly with him he retreated in a dignified manner

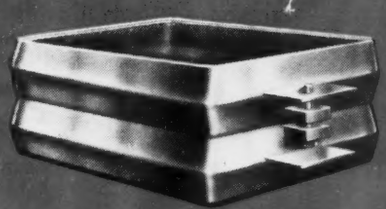
LOW FIRST COST
LOW OPERATING COST



6A—One man Flask for stacking.



10B—Round two man Flask.



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Divide the greater number of production hours given by a Shanafelt Flask into its low original cost, and you'll get a very happy answer. Shanafelt Steel Flask equipment has been proving its economy in American foundries for over 26 years. Check it for yourself. When you need new Flasks, just remember — SHANAFELT, CANTON, OHIO — and send us your inquiry. You'll like the price and you'll like the Flasks.

The combination of corrugated sidewalls and welded flanges makes a Flask with exceptional strength and rigidity. The size of the flanges and the thickness of the sidewalls are varied to suit the requirements. The Flask illustrated is 36" x 50" — 14" Cope — 12" Drag. Weight 1010# per set.

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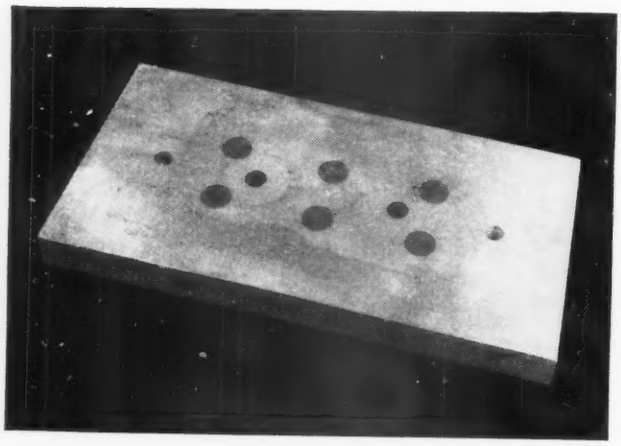

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- Strain relieved—machined both sides—thickness held to ± .010".

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TOOL AND JIG PLATE

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(*Continued from page* 226)

dismissed. "You to marry with my daughter! Such an insolence! I have a mill which will be hers some day. You have nothing. Begone!" "At the moment," James responded politely, "you seem to have a temporary advantage. Some day I'll have a mill that will make yours look like a pig sty." And he did.

He incorporated some of the finest and rarest domestic and foreign timber in the construction of this pet mill. The windows were stained glass and the floors were of the style known as parquet, with inlaid patterns. He operated the mill for only a short time and then leased it to a firm of paper makers. Probably disappointed because he never had the opportunity of showing it to the Sumptown miller.

At the time he built the elegant mill he also built a magnificent home. Common report at the time claimed the cost was $150,000. He lived in a single room in this great house for 15 years, commuting between San Jose and San Francisco. In the latter city he cheerfully handed over several million dollars to Old Ladies' Homes, Lick Technical School, Public Baths, Astronomical Observatory and many other items. The original Lick Museum was housed in a building in the center of the city for many years. About 15 years ago the trustees sold it in the Lick tradition at an immense profit, and then built the present museum right next to the City Hall.

The old financial and philanthropic rover finally returned to San Francisco in 1872 and took up residence in a room in the Lick House, recently erected and said at that time to be the most magnificent hotel in California. He died there Oct. 1, 1876 and willed the remainder of his fortune, about $3,000,000 to the Lick Fund for the benefit of San Francisco. The mill property and all acreage were turned over to the Tom Paine Society. When he was buried in San Francisco, his funeral was described as the largest and most impressive ever seen in California.

On Jan. 9, 1887 his body was removed to the great Lick Observatory, recently completed on Mount Hamilton. There he was buried beneath one of the huge instruments. The only monument was a large cast brass plate with the simple inscription, designed by himself, "Here lies the body of James Lick." I guess no one ever called him Jim.

"That reference to a large brass plate grave marker," Bill said, hopping nimbly from one subject to another, "reminds me of an inquiry I had recently from a man seeking information on a list of the largest bronze statuary groups in the United States."

"Did he tell you what he intended to do with the information when and if you gave it to him?"

"Old Hawkshaw himself. Sniffing a taint in every breeze. The man asked me a civil question and I saw no reason why I should not share with him my scanty store of knowledge. However, to take the taint out of the breeze, the letter was written on a foundry letterhead. It is universally recognized that foundrymen are the very impersonation of modesty, truth, and, in fact, all the cardinal virtues."

"O. K., O. K., I read them all under applied pressure many years ago. Kindly skip 'em and let's hear what you told this seeker after the light."

"Two of the largest bronze statuary groups of which we have any record were manufactured by the Roman Bronze Works Inc., Corona, L. I. They form part of the General Grant monument in Washington. Henry Merwin Shrady was the sculptor, and Edward Pearce Caset was the architect of the heroic-size cavalry group,

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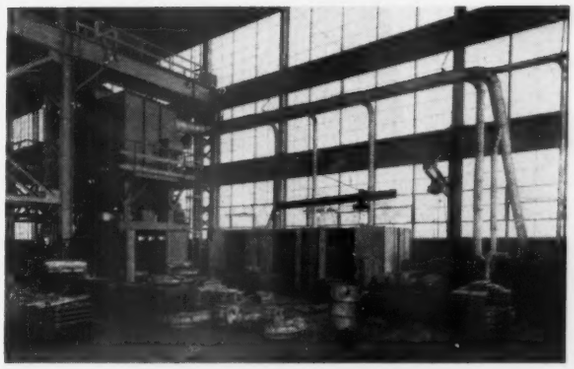

Sly Dust Filter mounted over Sly Blast Room

You, too, may have a dust problem as did this foundry before the installation of Sly Dust Control.

Note how clean the foundry is now . . . a good place to work — *efficiently*. Men like the better working conditions and produce more.

The Sly Dust Filter (shown at left) handles the dust created by a Sly Blast Room, grinder booths, and surface grinders. *The cleaned air contains no visible dust.*

In these days of "*forced draft*" production, equipment which helps increase production is worth looking into. Sly is *not* expensive as thousands of installations prove.

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28 ft long, 10 ft wide, 12 ft high, total weight 31,400 lb. The second or artillery group is 28 ft long, 10 ft wide, 11 ft high and weighs 28,600 lb. These are believed to be the largest bronze groups ever designed, cast and erected in this country.

"FOUNDRY for November, 1951 presented an illustrated description of four bronze equestrian statues, a gift of the Italian people to the United States. In a colorful ceremony held west of the Lincoln Memorial near the entrance to the Arlington Memorial Bridge and Rock Creek and Potomac Parkway, the bronze statues were presented by Italian Premier Alcide de Gaspari and accepted by President Truman. The statuary groups were designed and modeled by American sculptors Leo Friedlander and James E. Fraser. The design was approved as part of the Arlington Memorial Bridge project 20 years ago.

"Offer of the Italian government to cast the figures was made in 1949 as a gesture of goodwill toward the United States. One group was cast in the Lagana Foundry near Naples. A second group was cast in the Bruni Foundry in Rome. The third group was cast in the Battagli Foundry, Milan. The fourth group was cast in the Marinelli Foundry, Florence. Two groups weigh 11 tons each, and two groups weigh 13 tons each. The entire foundry project covered a period of 14 months. The castings were made by the lost wax process. One hundred pounds of 24 carat gold was applied to the surface of the castings to impart the so-called fire-gilt finish. The figures are said to be the largest equestrian statue groups in the United States."

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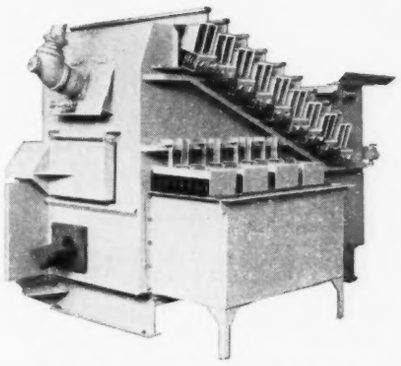

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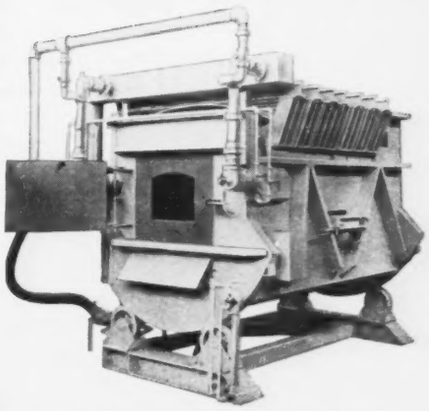

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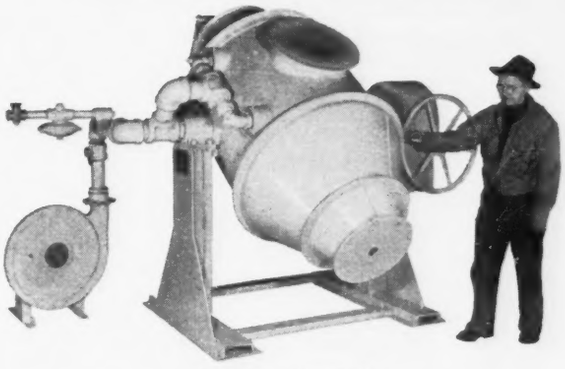
Excellent to run back returns along with ingot required for permanent mold, die or sand casting operations. Also an ideal breakdown furnace. Capacities—600-1000-1700-3000 lbs. Aluminum.



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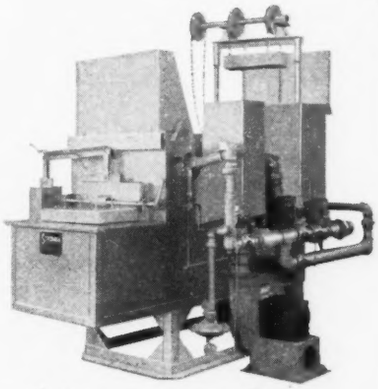
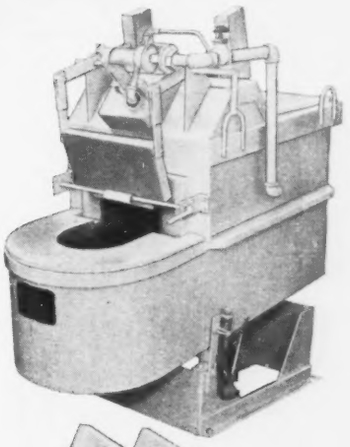
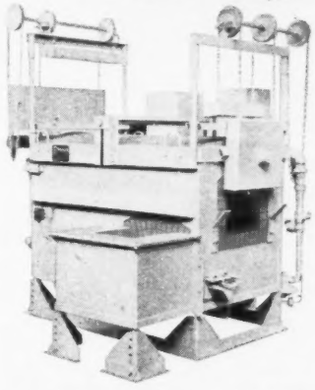
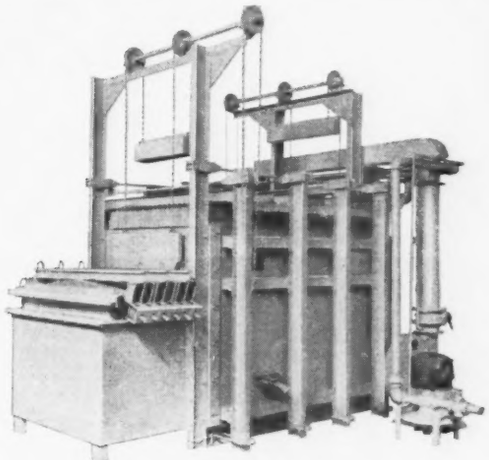
Hand tilt, open flame, barrel type furnace with flames firing tangent to inside of lining. Very fast melting. Used in all type plants including smelters. Capacities—500 lbs. Aluminum. A must for all aluminum jobbing sand foundries.









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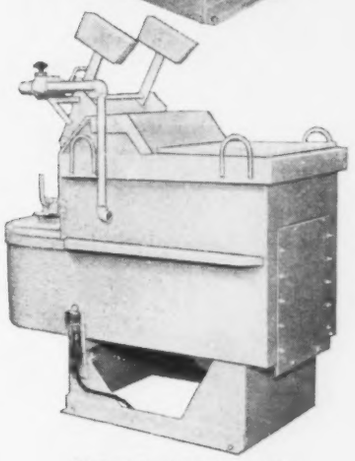

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MODEL "DC" FURNACE

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STROMAN FURNACE & ENGINEERING CO.

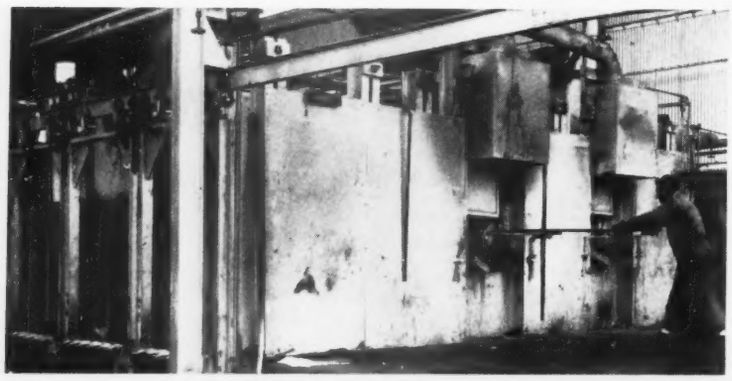
DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

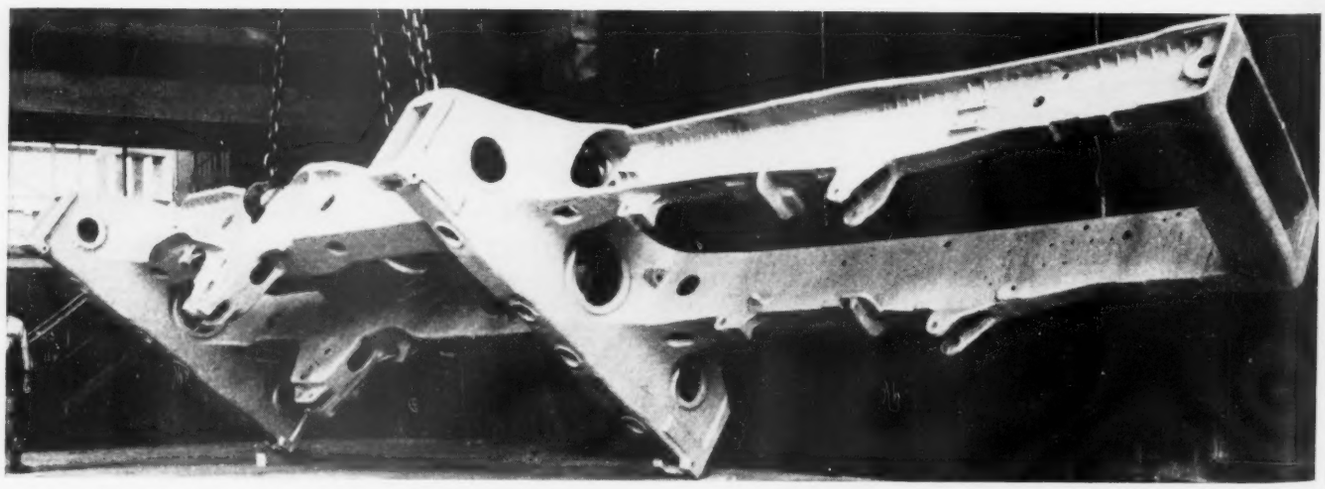
NEWS VIEWS

WAREHOUSE: Cleco Division, Reed Roller Bit Co., Houston, Tex., has opened this new sales office and warehouse at 18071 Wyoming Ave., Detroit 21. Complete facilities have been provided for servicing Cleco air tools in the Detroit area. B. O. Stoothoff is division manager.

SCAFFOLD CUTS RISKS: Sectional steel scaffold to lessen the risk of high jobs was designed and built by the maintenance department at the Torrance, Calif., plant of National Supply Co. Platforms may be placed at the levels desired. This shows the cab of the weld shop crane being moved from the center to the side.



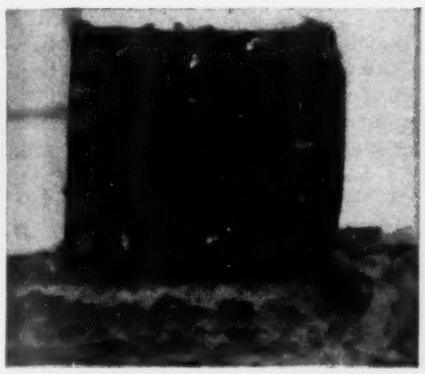
NEW SMELTING PLANT: The two top-charged 60-ton reverberatory furnaces shown here are part of the facilities of the new brass and bronze ingot smelting plant opened in El Segundo, Calif., Oct. 14, by H. Kramer & Co., Chicago. Plant equipment includes two rotary type furnaces, a number of tilting furnaces, a cupola, a zinc oxide dust collector and a water reclamation system.



CRANE CHASSIS: This 13-ton, one-piece steel casting is the type being used by Thew Shovel Co., Lorain, O., for the chassis frame of what are said to be the world's largest cranes on rubber tires. Replacing a welded structure formerly used in automotive type cranes, the castings are made by General Steel Castings Corp. They are 31½ ft long, 10 ft wide and 3 ft 9 in. deep. Thew Shovel reports these advantages for the casting over a weldment: Better distribution of metal to sections where strength is needed; simplification of the crane assembly by eliminating handling and assembly of structural members; elimination of costly repairs to welds.

OUTSTANDING CUPOLA CAST IRON DEOXIDIZER!

New FERROCARBO patented Briquette disperses completely in 57.5 seconds



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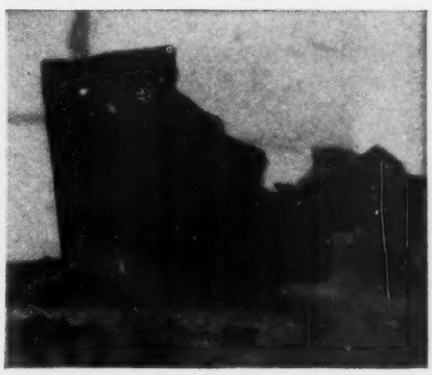

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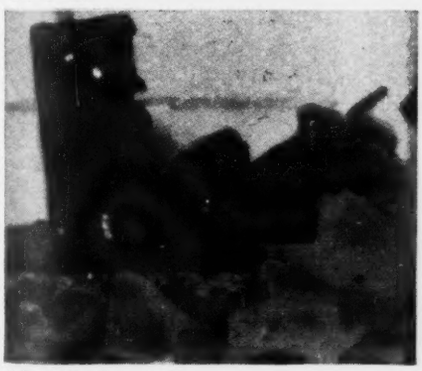

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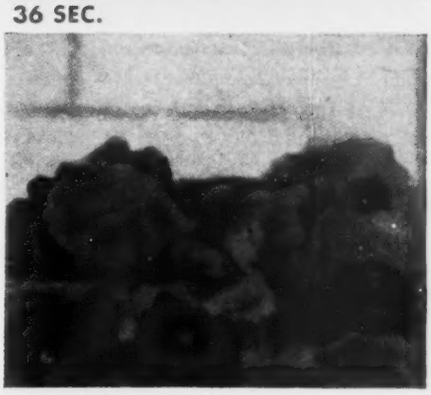

57.5 SEC.

Here's dramatic proof, in actuai film sequences, that FERROCARBO Briquettes are truly *effective* in deoxidizing cupola iron. Rapid, controlled disintegration of FERROCARBO Briquettes is *complete* in the melting zone. 100% dispersion of the briquette throughout the metal means a thorough reaction in the cupola. You can't match FERROCARBO Briquettes for uniform cupola operation ... for castings that are cleaner, more uniform, easier to machine. No wonder nearly 600 leading foundries are deoxidizing their cast and malleable iron with FERROCARBO Briquettes!

FERROCARBO

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Briquettes by CARBORUNDUM

PHONE OR WRITE THE FERROCARBO DISTRIBUTOR NEAREST YOU

KERCHNER, MARSHALL & CO.
PITTSBURGH
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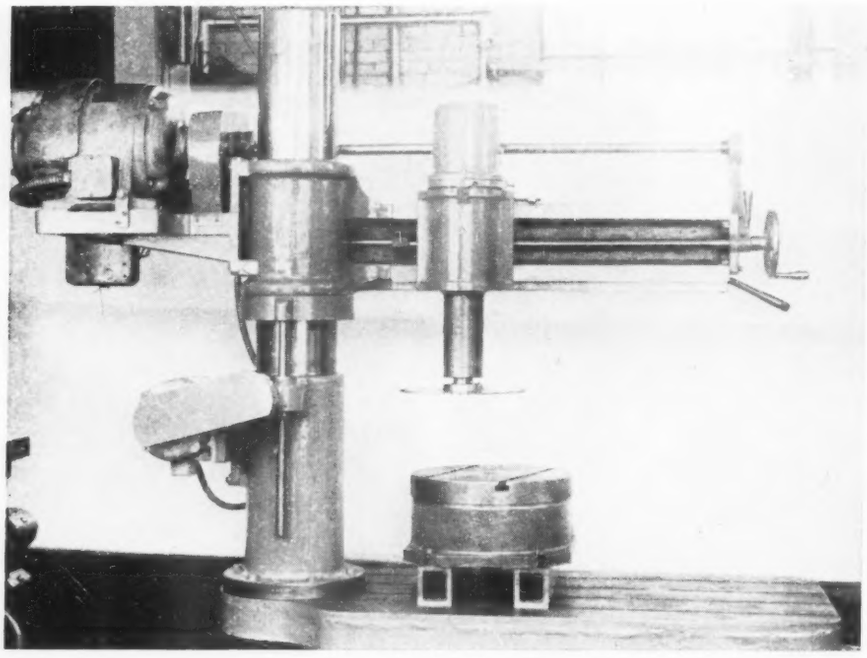
R4-56

New EQUIPMENT and



Cut-Off Machine: Acme Saw & Mfg. Co., 1447 East 47th St., Cleveland 3—Radial-type gate and riser cut-off machine for all types of nonferrous castings is said to perform complete gate and riser removal in one operation, eliminating chipping, bandsawing and grinding operations. According to the manufacturer, cuts are clean and accurate and require a minimum of machining. The machine is designed with bed, arm and carriage similar to those of conventional radial drills. The cutter carriage moves laterally on a 6-ft swinging arm counterbalanced by a 15-hp motor on the opposite side of the 10-in. supporting column. The cutter arm rides on a 10-in. thrust bearing, can be rotated in a 360-degree arc and will cut up to a 55-in. radius. It can be adjusted vertically to a height of 40 in. The machine is said to be able to cut from all sides of a casting on a horizontal plane.

For More Details Circle No. 1—Page 237

Materials Handling Boxes: Aluminum Co. of America, 801 Gulf Bldg., Pittsburgh 19—All-aluminum materials handling boxes designed by the company measure 36 x 42 x 60 in. and are constructed of welded 61S alloy sheet and extrusions. Welds are made by either inert gas shielded arc or the sigma process. At the firm's Cleveland plant, 500 of these boxes serve a dual purpose, handling finished products or scrap. Mounted on low runners, they can be lifted by fork trucks and carried, stacked or turned over and the contents dumped. The runner is formed like an I-beam for added strength, and tiering lugs make stacking easy. The boxes weigh 245 lb, carry up to a 5000-lb load and

resist corrosion and corrosive fumes. They were made for Alcoa by Powell Pressed Steel Co., Hubbard, O.

For More Details Circle No. 2—Page 237

Work Gloves: Surety Rubber Co., Carrollton, O.—Work gloves are made with closed, flexible metal zippers permanently bonded to fingers and palms in synthetic rubber; they combine positive gripping action and long wearing qualities with maximum pliability. The company's line includes gloves, mittens and palm guards,

manufactured in all sizes and styles for jobs that require protection for palms and fingers.

For More Details Circle No. 3—Page 237

Molding Machine: Johnston & Jennings Co., Division of Pettibone Mulliken Corp., 2424 North Cicero Ave., Chicago 39—Jolt squeeze pin-lift machine has concentric draw design with a single concentric draw cylinder guided by a full diameter bearing area of the squeezing cylinder to assure smooth, accurate draw. Positive slow and fast draw on same stroke has automatic vibrator control, and length of slow draw is automatically controlled. Machine comes equipped with an air-operated swinghead for either left or right hand operation. All working parts are fully enclosed. Hardened and ground internal guides assure retained accuracy of draw with minimum maintenance, it is said. Two pilot valves control all operations, including that of the swinghead. Manufacturer claims that an inexperienced worker can become a qualified machine operator after a few cycles of operation.

For More Details Circle No. 4—Page 237

SUPPLIES

For More Details on these Items
Use Reply Card—Page 237

Locker: Penn Metal Corp. of Penna., 50 Oregon Ave., Philadelphia 48—Steel locker removes odors and keeps clothing fresh and dry by a built-in ventilating system which circulates clean, treated air through it. A louvered, sloping bottom with shoe holder prevents dirt and trash accumulation inside locker and speeds drying of wet shoes. Smooth, flush-front design and an elevated dressing bench make locker exterior and locker room floor easy to clean. Other equipment includes a hat holder, a storage shelf, a coat rod and hooks and an automatic locking device. The locker may be installed in either new or old buildings.

For More Details Circle No. 5—Page 237

Tractor: Frank G. Hough Co., Libertyville, Ill.—Rubber-tired tractor with four-wheel drive is recommended by manufacturer for heavy-duty drawbar and pushing work either on or off pavement. When used as a railroad car switcher and spotter for industrial plants and yards, it can pull or push eight to ten loaded cars. Big earthmover tires roll readily over ties and tracks, and torque converter drive assures precise control. It is available with 106-hp gasoline engine or 90-hp diesel engine, weighs 25,000 lb, develops up to 16,000 and 14,000 lb drawbar pull with gasoline and diesel engines, respectively, has four gear ratios in both forward and reverse, and has top speed of 27 mph.

For More Details Circle No. 6—Page 237

Vibration Determiner: Martin Engineering Co., Kewanee, Ill.—Instrument, 6½ in. long, accurately measures speed and amplitude of vibration on pattern plates or machinery or on bins and hoppers where vibration is produced intentionally to aid materials movement. When the nose is placed against a vibrating object, a tuning slide is moved up and down the scale until a wire reed, which extends out of the nose as the side is moved, reaches maximum "throw." Multiplying the scale reading by 1000 then yields the vibration in cycles per minute or shaft speed

in rpm. The arc through which the reed "throws" is in direct proportion to amplitude. Range is from 2000 to 15,000 cycles per minute. Higher speeds register and can be estimated closely.

For More Details Circle No. 7—Page 237

Contactors: Allis-Chalmers Mfg. Co., General Machinery Division, Milwaukee 1—Line of heavy-duty, single-pole, direct-current contactors for use on rolling mill controls, mill auxiliaries, cranes, hoists and related equipment is built for long contact and arc chute life and designed to speed routine inspection and facilitate rapid replacement of wearing parts. Contact life is extended greatly by a new principle of arc interruption which reduces contact burning by speeding arc extinction. Main contacts are made of heavy, forged copper with high material density and uniformity. These contacts are available in ratings of 150, 300 and 600 amp at 600 v maximum.

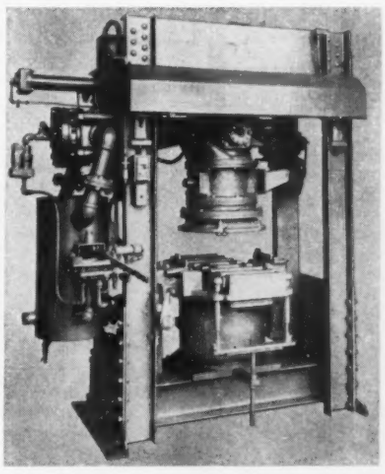
For More Details Circle No. 8—Page 237

Lining Material: Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47—Graphite-impregnated plastic is used for lining steel and gray iron ladles; spouts, runners, tap hole blocks, breasts of cupolas, and ferrous and nonferrous barrel and rocking type furnaces. It is said to withstand severe thermal shock and to permit cleaner castings. Lubricating action of the graphite in the lining assertedly facilitates fast, clean pours and easy skimming.

Core Blower Has Automatic Cycle Control

CORE blower will blow and draw eight cores in a box with a 5½-second machine cycle, according to the manufacturer. Fully automatic cycle control is achieved by the use of a hydraulically controlled air timer. This timer assertedly has made operation of the machine so simple that it can be operated by unskilled labor. It is said to enable the operator to run an adjacent rollover while the machine is going through its blowing cycle. The cycle is infinitely controllable.

Hard, chrome-plated valve seats protect the timer from corrosive foreign matter in the foundry air lines that could impair efficiency and accuracy of the unit. A stationary magazine on the core blower assures perfect alignment of the corebox at all times, and corebox handling devices can be installed without difficulty. The new core blower has a large throat



opening to permit smooth flow of sand from supply hopper into the throat of the machine, eliminating danger of clogging.

The machine is manufactured by Wm. Demmler & Bros., Kewanee, Ill.

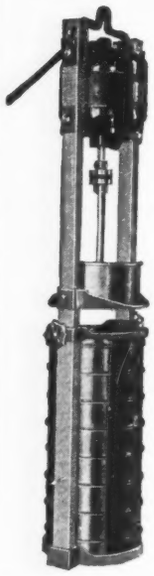
For More Details Circle No. 9—Page 237

COMBS FOUNDRY RIDDLES

Let ONE MAN Do

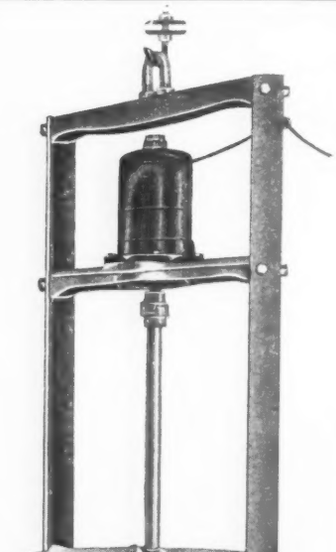
As Much as TWENTY!

WORLD FAMOUS!

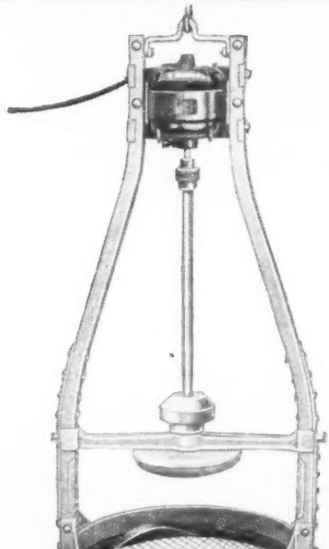


Type "HL" Lab Sifter for sand control $202.00 without sieves

Type "CS" with 24" square screen and automatic discharge $320.00.



Type "CR" with 24" sieve $310.00



Type "V"
With 20" sieve $250.00
Also made with 36" sieve $450.00

All these machines cost less than 1c an hour for power. Quickly removable steel rim sieves can be removed, emptied and replaced in seconds. Saves up to 97% of your labor costs. Send for free descriptive folder.

Prompt Delivery From Your Foundry Supply House

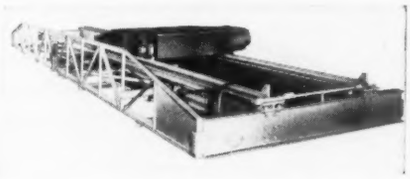
GREAT WESTERN MFG. CO.

Leavenworth, Kansas

The product comes machine-mulled in 100-lb cartons ready for use. Graphite in it is chemically treated so that it will not oxidize (burn out of the mix). A supplementary wash, to be mixed with water and painted on, is designed as a wash coat after the lining has been dried.

For More Details Circle No. 10—Page 237

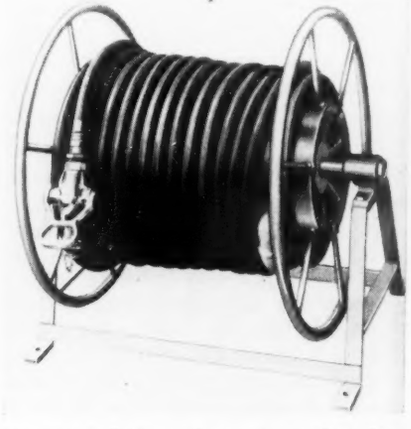
Cranes: Manning, Maxwell & Moore Inc., Shaw-Box Crane & Hoist Division, Muskegon, Mich.—Standardized, overhead, electric, traveling cranes of 1 to 20 tons capacity are intended to provide adequate crane service for average industrial re-



quirements more inexpensively than heavy duty industrial service electric cranes. The new line is made up of three types, each developed for specific industry requirements. Features include antifriction bearings, rotating axles, pushbutton variable speed magnetic control on floor controlled cranes and master switch control on cage controlled cranes. These cranes are available with a variety of speeds and heights of lift.

For More Details Circle No. 11—Page 237

Hose Reel: Wirt & Knox Mfg. Co., Sedgley Ave., York & 23rd Sts., Philadelphia 32—A continuous flow hose reel makes water pressure available at the hose nozzle even when the



hose is coiled on the reel, so that fires can be fought instantly and water damage kept to a minimum. A swivel joint connection in the pipe line permits application of a full stream of water on the fire while the hose is being unreeled. Kinks and tangles often encountered when dry hoses are

(*Continued on page* 239)

IDEAS FOR FOUNDRYMEN

AVAILABLE FOR THE ASKING—This reader-service is designed to provide foundrymen with "idea" and reference material. Listings are selected from company product literature and reprints of special FOUNDRY editorial articles.

51. Sectional Conveyors

A. B. Farquhar Co.—DO YOU handle various loose and bulk materials and packaged goods? IF SO, send for 4-page illustrated bulletin 346 on model 346-2 sectional trough conveyors. YOU WILL find complete specs, application info, plus the dope on accessories available.

52. Foundry Hoods

claude b. schneible co.—since installation of dust, fume and smoke hoods for shakeouts, pouring stations and mold conveyors would be a definite capital improvement, we are running this without capitals. bulletin no. 450 describes the equipment, shows applications and cross sections and outlines savings.

53. Fused Refractories

Norton Co.—Made with the assistance of a psychologist, who stabilizes them, the fused Zirconia refractories described in form 1409 will withstand the high temperatures. Technical data, uses, availability and general info is presented. Tables and charts, too.

54. Grinding Wheels

Mid-West Abrasive Co.—Some interesting grit 'nd grind information on Fiber-Cushioned snagging and self-dressing centerless grinding wheels is yours for the asking in two 4-page descriptive bulletins. If you're gruntin' and groanin' with grindin' gripes, grab a gander at these booklets.

55. Colloidal Graphite

Acheson Colloids Co. — Did you know that innumerable properties of lubricating, conductive, absorptive, reflective and pigmentary value are imparted to surfaces by colloidally dispersed graphite? Then there's impregnation with graphite to obtain certain qualities. These are but a few of the facts gleaned from 6-page illustrated bulletin 435 which deals with colloidal graphite for surface coatings and impregnation.

56. Alloy Steel Products

Stulz-Sickles Co.—"Foundry Applications for Manganal Manganese-Nickel Steel Welding Products" is title of this 5-page issue of the Manganal Marketer. It covers applications for shakeout machine, shot blast hooks, shot blast cabinets, and barrel type shot blast machines. Products are applicator bars, Tite-Kote welding electrodes, deflector plates, hot rolled plates and others. Sizes are given.

57. Wood Safety Tread

Rock River Lumber & Grain Co.—You've seen safety tread steel plate, but have you seen a safety tread in wood? Well, here is a folder describing it, the sizes available, th cknesses, lengths. Seven patterns are illustrated. Don't slip up on getting this, skidoo.

58. Conveyor-Elevator

Stephens-Adamson Mfg. Co.—In 16 pages of highly illustrated bulletin 349 is contained complete information on Zipper closed-belt conveyor-elevators which can convey and elevate bulk and granular materials in any plane, without spillage, breakage or material contamination. It's what you might call a virtuous belt, because it zips up just when things start taking a bad turn.

59. For Sound Hard Castings

Milward Alloys, Inc.—Your castings may need a Bromo during melting to free them from entrapped gases (burp!) and oxides as well as something to make them hard. 8-page catalog No. 1051 describes a few deoxidizers and degasifiers as well as hardeners and a smokeless, odorless aluminum flux that may be just what the doctor ordered.

Additional Information?

For additional information on any of the items described under "New Equipment and Supplies," "Trade Publications" or "Helpful Literature" in this issue—simply circle corresponding item numbers on one of these cards

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60. Conveyor Stuff

Chain Belt Co. of Milwaukee makes all types of conveyor chains and attachments. There's any kind you need detailed in 12-page bulletin 50-35, whether your problem's hot castings, cores, sand or scrap. How to select the right chain for each job is explained in this manual.

61. Tramrail Handling

Forker Corp.—How Ohio Tramrail systems and cranes can solve your foundry's distribution problems is outlined in this 4-page bulletin 107 entitled "Ohio Tramrail for Versatile Handling." In word, picture and diagram it tells how one foundry saved an estimated $100,000 per year.

62. Metered Loading

Michigan Crane & Conveyor Co.—Small parts and castings are conveyed, elevated and metered to heat treating furnaces or similar processing machines at any desired rate with the Man-O-Steel automatic furnace loader. Just how this machine increases production and assures safety is related in 4-page illustrated bulletin.

63. Testing Attests Quality

Steel City Testing Machines, Inc. —Brinell, ductility, compression, tensile, universal, transverse, hydrostatic and special purpose testing machines are shown and briefly described in 4-page illustrated bulletin G 252. You can cull out those defective castings, improve your quality and be sure every time if you test.

64. Air & Gas Flow Control

Hauck Mfg. Co.—Flow rate of air or gas of any desired characteristics can be obtained with Hauck adjustable flow valves detailed in 8-page illustrated catalog 713. Described are single and dual valve proportioning applications at pressures to 25 psi and temperatures to 300° F.

65. Good Connections

Joy Mfg. Co.—You'll always enJOY troublefree electrical connections if you JOYn power feeders with JOY plugs and receptacles. Six styles of neoprene connectors for industrial use are described as waterproof, shatterproof and resistant to sunlight, oil, acid and heat in 4-page illustrated bulletin B41.

66. Flasks

Hines Flask Co.—If you're "teed off" with your flasks, pardon us while we "spout off" about Hines "Pop-Off" flasks, called this because you simply move the levers and off pops the flask. No mauling or pounding. Get the specs, plus other info on jackets in 4-page illustrated catalog No. 101.

67. Self-Cleaning Conveyors

Carrier Conveyor Corp.—You'll be coming in on the beam when you send for this 12-page illustrated catalog on self-cleaning Natural-Frequency conveyors. Principle of the conveyors is the substitution of brute force with vibration at the exact natural frequency of the springs. You pay only for the power required to move the material. Get a move on!

68. Aluminum Alloy Properties

U. S. Reduction Co. — Here's a cardboard slide-rule type gimmik what'l give youse da mekanical and fizzical properties of twenny-tree differnt USCO aluminum alloyses. Get it while they's hot.

69. Gating Material

M. A. Bell Co.—Flexi-Gate, a flexible gating material which can be molded to fit any pattern by bending to the desired angle, can save you money. To learn how, get folder type descriptive mailing piece.

IMPORTANT READING FOR FOUNDRYMEN
We have a limited quantity of the following reprints which we can furnish while they last.

70. Shell Molding Process

"The Shell Molding Process, Its Mechanics and Applications" is the title of a well-illustrated FOUNDRY reprint of 10 pages which in reality is a primer of the process. It delves into pattern equipment, gating and heading, dimensional tolerance, closing molds, cores, plant safety and metallurgy.

71. Al-Ni Bronze Castings

"Production of Aluminum-Nickel Bronze Sand Castings" is title of this FOUNDRY-reprinted article by Vincent DePierre and Richard C. Wynne, metallurgists of the U. S. Naval Gun Factory. It uses pictures, tables, diagrams and graphs in presenting its technical data.

72. Foundry Modernization

Employing only limited mechanization, Dalton Foundries of Warsaw, Ind., is operating a completely modern foundry. Here, in a very informative FOUNDRY reprint, Lester B. Knight of Lester B. Knight & Associates Inc., gives you the pertinent details. He points out how various operations can be modernized without complete mechanization.

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6	18	30	42	54	66	78	90	102	114
7	19	31	43	55	67	79	91	103	115
8	20	32	44	56	68	80	92	104	116
9	21	33	45	57	69	81	93	105	117
10	22	34	46	58	70	82	94	106	118
11	23	35	47	59	71	83	95	107	119
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(*Continued from page* 236)

removed from reels or hangers are eliminated together with the time required to straighten them. Rounded surfaces prevent damage to the hose, and a universal mounting permits easy installation on walls, columns, ceilings or floors.

For More Details Circle No. 12—Page 237

Copying Machine: Remington Rand Inc., 315 Fourth Ave., New York 10—Machine makes photo-exact, positive copies of any record, re-

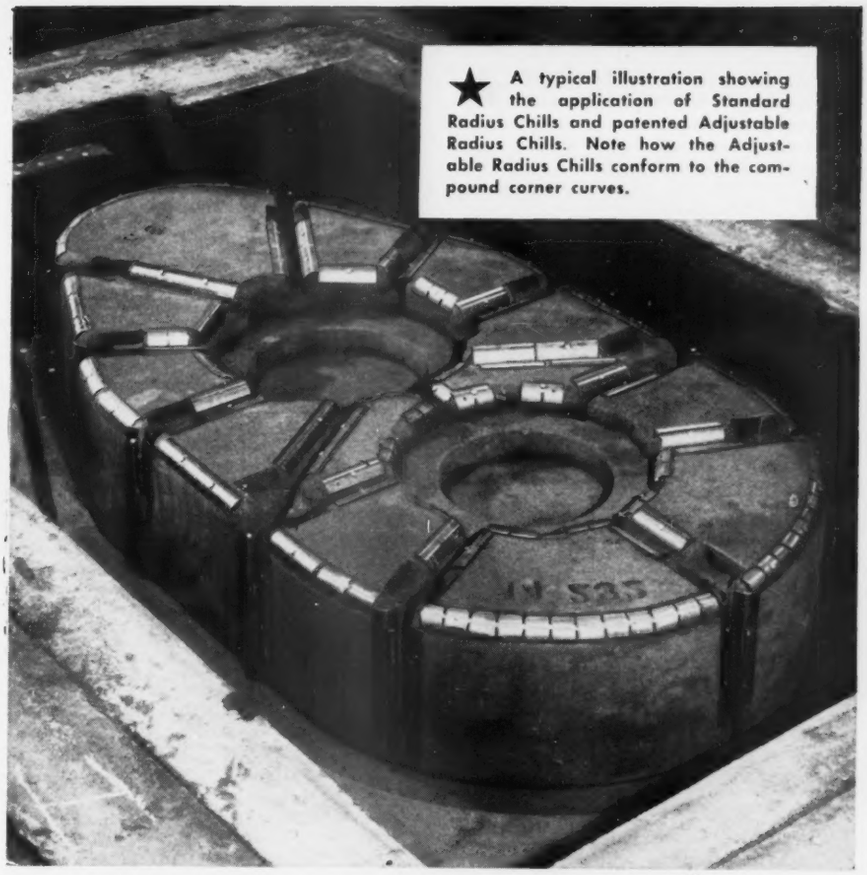
gardless of type or color, from originals up to 14 in. wide and any length. The machine is small and compact and operates when plugged into any electrical outlet. The record to be copied is placed on the printer face-to-face with a sheet of negative paper and exposed. The exposed negative and a sheet of positive paper then are placed in the machine, emerging in about ten seconds with the positive printed.

For More Details Circle No. 13—Page 237

Burn Treatment: Drug Products Corp. of America, 15012 Kinsman Rd., Cleveland—Aerosol treatment for minor burns utilizes freon as a propellant and benzalkonium chloride, mixed with a bland vegetable oil base, as a germicide. A simple valve sends out a fine spray from the pressure container and quickly relieves burned areas. Suitable for any industrial first-aid station, the product serves as a treatment for any type of burn.

For More Details Circle No. 14—Page 237

X-ray Film Cassettes: General Electric, 4855 Electric Ave., Milwaukee 14—Magnesium-front cassette assertedly eliminates poor contact between screens and film in x-ray film cassettes because of its resistance to warping. Magnesium has six times the rigidity of the plastic formerly used as the cassette front, and is virtually unaffected by



★ A typical illustration showing the application of Standard Radius Chills and patented Adjustable Radius Chills. Note how the Adjustable Radius Chills conform to the compound corner curves.

ASK FOR

Milwaukee

RADIUS CHILLS

Straight Section or Adjustable

Milwaukee straight section Radius Chills have been used to considerable advantage on straight fillets and edges in many leading steel foundries. The new patented Adjustable Radius Chills, with equally spaced slots so that sections may be cut off in one inch segments, fulfill the need where chills are necessary along the fillets of cylindrical, round, or irregularly shaped castings. These Adjustable Chills have effected substantial savings in welding and cleaning costs.

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Milwaukee Chaplet & Mfg. Co.

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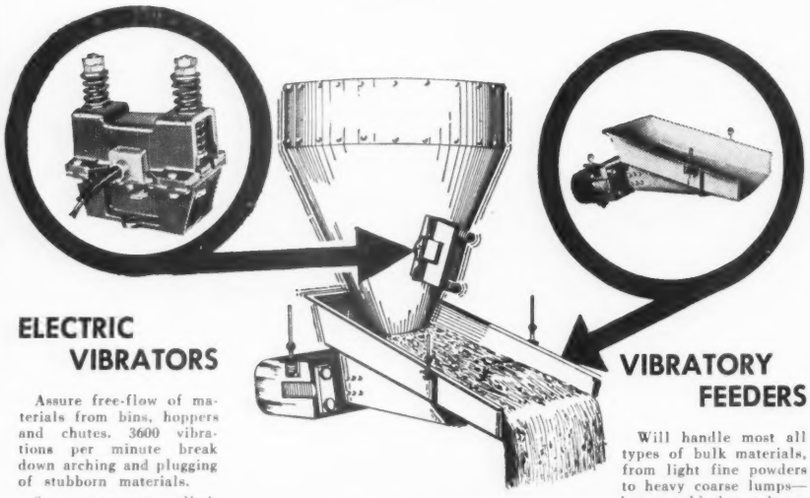
VIBRATORY EQUIPMENT
Simplify Your Material Handling Problems



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Assure free-flow of materials from bins, hoppers and chutes. 3600 vibrations per minute break down arching and plugging of stubborn materials.

Save manpower — eliminate the pounding, rodding and poking that damages bins and hoppers and wastes time and materials.

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VIBRATORY FEEDERS

Will handle most all types of bulk materials, from light fine powders to heavy coarse lumps—hot or cold, dry or damp, at variably controlled rates from pounds to hundreds of tons per hour.

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Chill Nails and Spiders

You can rely on "KOOLHEAD" and "STANHO" products

for... ACCURATELY CONTROLLED FOUNDRY CHILLING

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Choose any style from Jumbo to Stubby; slim, medium or horse nail blade; blunt, pointed, straight or 90° bent. There's a type and size Koolhead Chill Nail or Spider Chill to do your specific chill job best.

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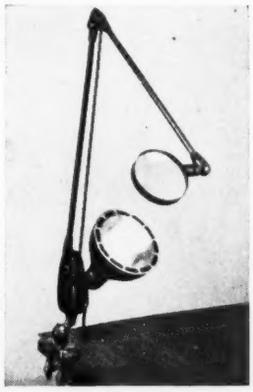
STANDARD HORSE NAIL CORP
Since 1872 NEW BRIGHTON, PA

heat and moisture. Its use avoids the need to employ air bags or other methods to insure permanent contact between screen and film, and the manufacturer claims that radiographic results are markedly improved. These cassettes require no change in x-ray technique. They are 6 oz heavier than older types.

For More Details Circle No. 15—Page 237

Magnifier: Picker X-Ray Corp., 25 South Broadway, White Plains, N. Y.—Clamp-on spotlight with attached magnifying lens 5 in. in diam enables radiographer to examine high



density areas of industrial radiographs. It attaches to any surface or may be permanently installed by removal of the dual-clamp fitting. Because air flows between the inner lamp reflector and its outer housing, carrying off the heat, burns are avoided. The arm extension measures 34 in. from the fulcrum and permits use of the magnifier over a wide area.

For More Details Circle No. 16—Page 237

Test Gage: Foxboro Co., Foxboro, Mass.—Test gage is available in ranges of 0-30 in. of mercury vacuum up to 0-10,000 psi gage and is guaranteed accurate within ½ of 1 per

cent of the total scale at any point throughout its range. It serves to check pressure controllers, recorders and indicators and furnishes a standard of accuracy for calibrating other

(*Continued on page* 242)

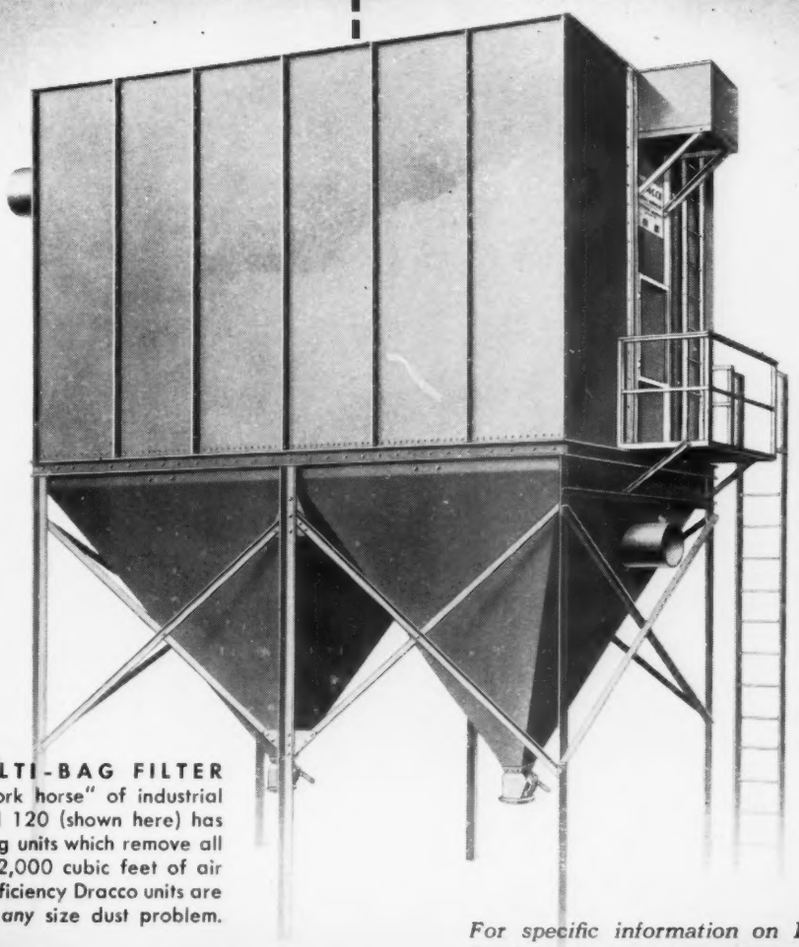
There's a Technique for *Everything*... Particularly Foundry Dust Control!

Whether it's producing intricate castings or doubling your output, there's a *proper* technique for everything! And in the all-important elimination of damaging foundry dusts the proper technique is vital.

Dracco engineers have mastered the technique of dust control through the experience of producing thousands of "Performance Proved" installations. Dracco Dust Control Equipment—fitted to the requirements of your foundry by *application engineering*—will give you the best dust control.

Why not investigate today?

DRACCO CORPORATION
Harvard Avenue and E. 116th Street • Cleveland 5, Ohio



DRACCO MULTI-BAG FILTER ... the famous "work horse" of industrial dust control. Model 120 (shown here) has 360 special filtering units which remove all visible dust from 12,000 cubic feet of air per minute. High-efficiency Dracco units are available to solve *any* size dust problem.

For specific information on Dracco Dust Control Equipment, contact your nearest Dracco representative or write Department G-12, Cleveland, Ohio.

DRACCO *Performance Proved*

Airstream CONVEYORS • DUST CONTROL EQUIPMENT

Fitted for Every Job Need

DIPPED NEOPRENE INDUSTRIAL GLOVES

SAFE—They can help prevent costly accidents. The rough-surface fingers assure positive, easy gripping. And Neoprene withstands gasolines, oils, greases and corrosive chemicals.

COMFORTABLE—The curved finger construction conforms to the natural curve of hand—eliminates straining and pulling. Highly flexible, they permit easy, natural working motions.

ECONOMICAL—They are built for long wear and tough service. Full range of sizes, lengths and weights. U. S. technical men will be glad to analyze your glove needs and recommend the correct glove for each of your jobs. Available from your nearest United States Rubber Company Branch.

U. S. INDUSTRIAL GLOVES

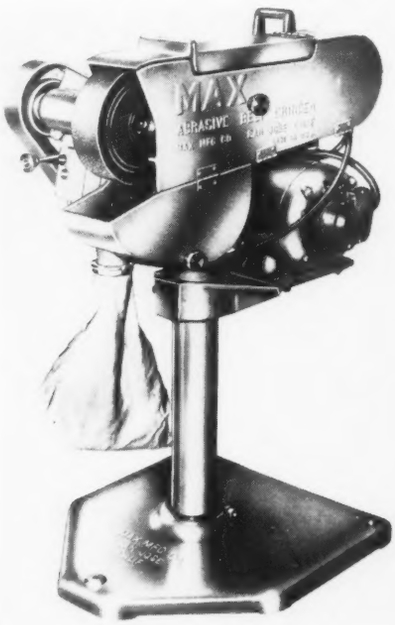
UNITED STATES RUBBER COMPANY

(*Continued from page* 240)

pressure testing equipment in the instrument department, according to the manufacturers. Case is cast aluminum, threaded to receive a brass ring finished to match the case. The measuring element is a full 270 degree Bourdon spring of steel or beryllium copper. Movement consists of chrome-plated steel pinion, segment and arbor, monel plates and a stainless steel hairspring.

For More Details Circle No. 17—Page 237

Belt Grinder: Max Mfg. Co., 138 Stockton Ave., San Jose, Calif. — Abrasive belt grinder is equipped with guards over both the drive belts and the abrasive belt. Abrasive belt guard



can be opened several different ways, for easy belt changing, platen grinding against a stop, free belt grinding, and grinding on the entire top surface of the abrasive belt, with or without the platen. An exhaust system or a continuous duty dust collector can be attached to the dust chute. The dust collector is driven off the regular drive belt.

For More Details Circle No. 18—Page 237

Instrument Lighting: Minneapolis-Honeywell Regulator Co., Industrial Division, Wayne & Windrim Aves., Philadelphia 44 — Fluorescent lighting for electronic and rectangular case instruments and for control room panels includes a cool-burning white daylight lamp, a starter for preheating lamp filament cathodes and a ballast which limits current and voltage to a required value. In addition, a reflector ring is included in circular chart instruments to disburse light evenly over the chart.

(*Continued on page* 244)

BIG SAVINGS IN PATTERN SHOP TIME AND LABOR with SCIENTIFIC Pressure Cast MATCH PLATES

YOU NEED NO MORE THAN ONE MASTER PATTERN

• FROM IT WE MAKE PRECISION MULTIPLE DUPLICATES IN ONE COMPACT MOLD.

Cast of aluminum, the plates are poured under pressure to assure filling all detail. Molding is done in plaster only, for extreme accuracy.

Expensive duplicate master patterns and high cleaning costs are eliminated.

WRITE FOR BULLETIN NO. 52

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Starting point for profitable electric furnace steelmaking-

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"Performance-Proved" Electrodes

Basic to any profitable electric furnace steelmaking operation are the electrodes. For optimum results they must be properly designed, correctly manufactured.

That's why "performance-proved" I.G.E. electrodes are so popular. Users know they are made with extreme precision, thus assuring these important physical properties . . .

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- **High mechanical strength**
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Result: I.G.E. electrodes save you money by lasting longer and producing higher tonnages.

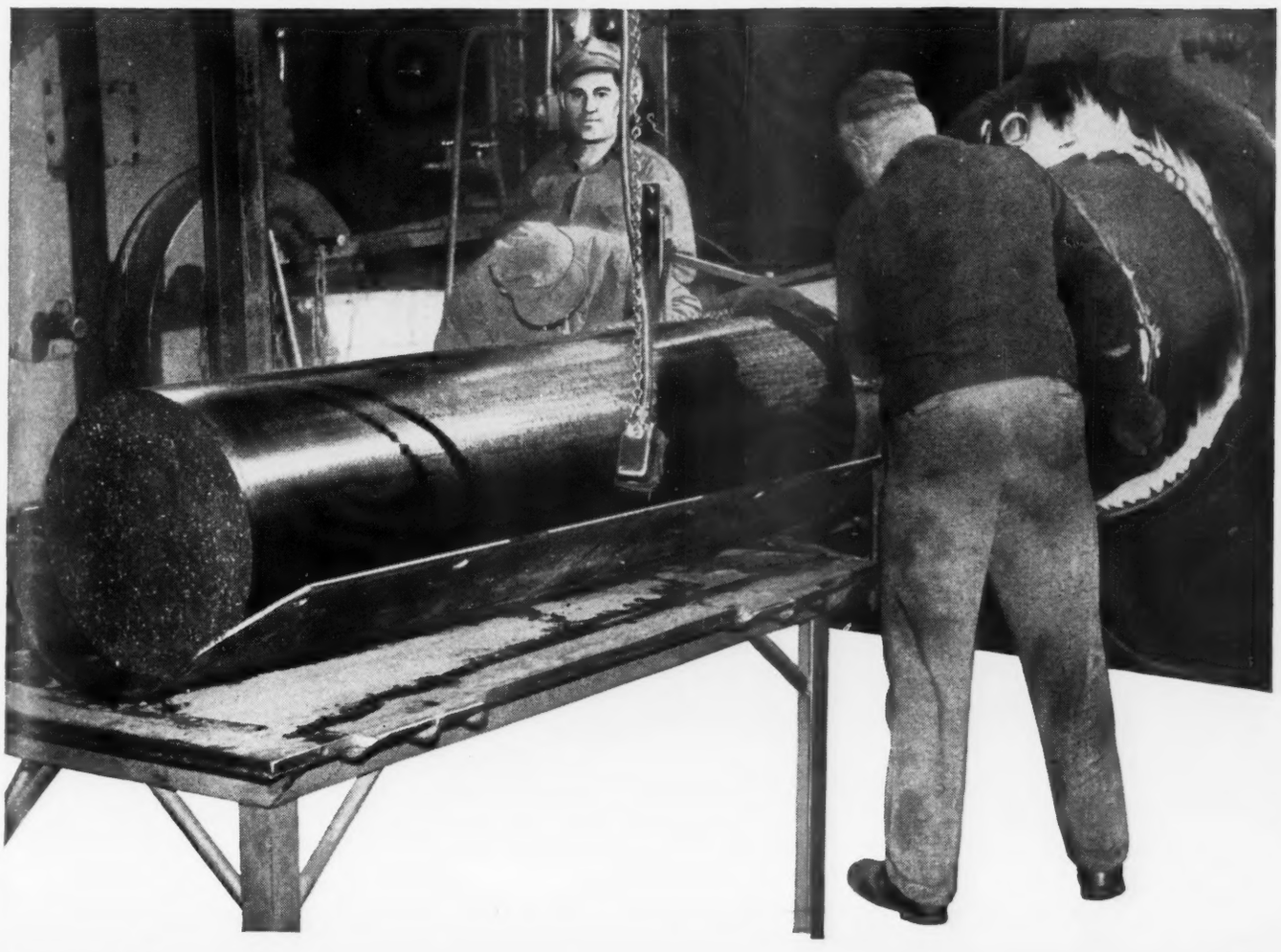
Coupled with I.G.E. quality is I.G.E. technical service. Call on our nearest service representative today. His background in all phases of furnace operation is available to help you with *your* problems.

IGE

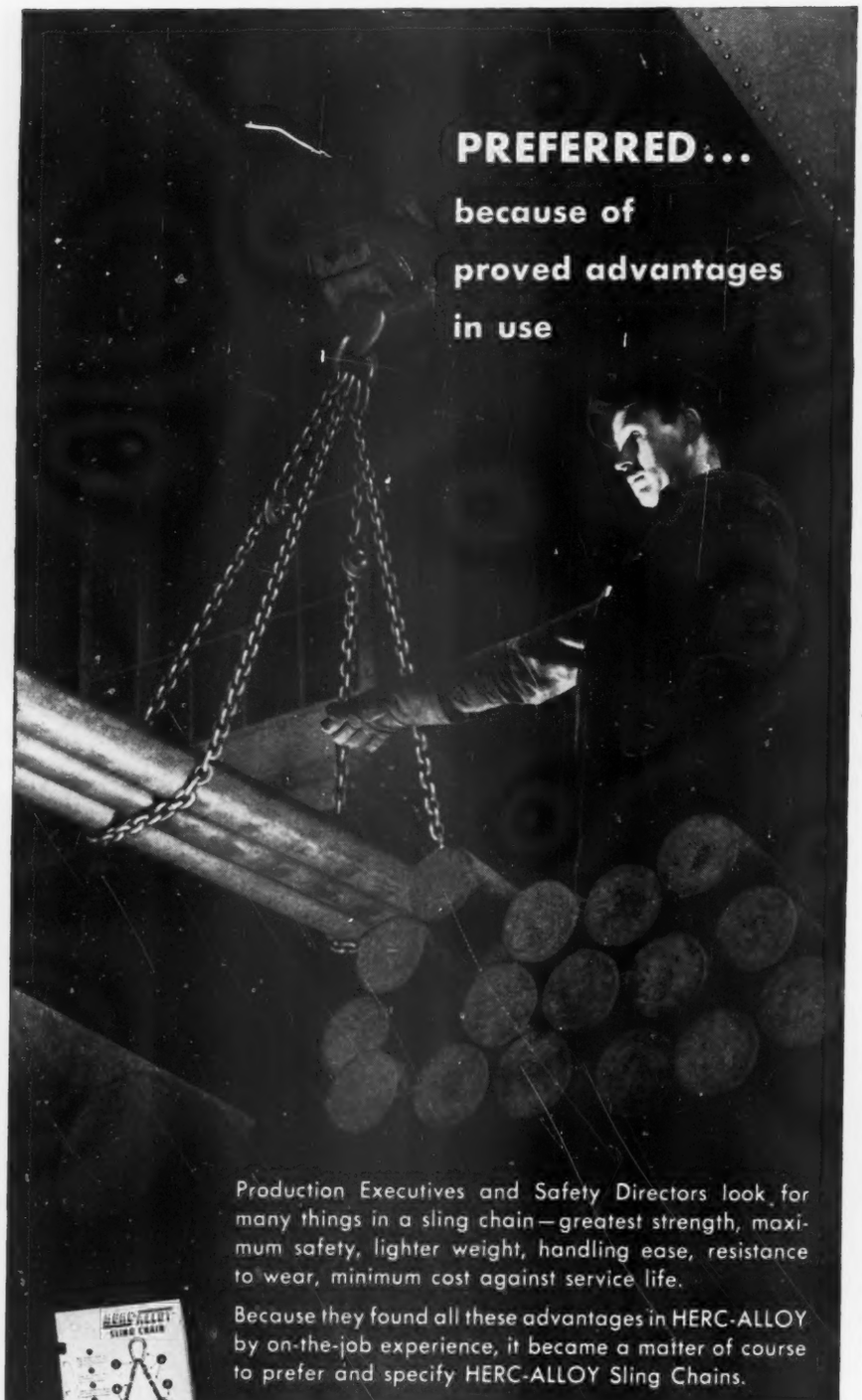
INTERNATIONAL GRAPHITE AND ELECTRODE DIVISION

Speer Carbon Company, St. Marys, Pennsylvania

Other Divisions: Jeffers Electronics • Speer Resistor



HERC-ALLOY
SLING CHAINS



Production Executives and Safety Directors look for many things in a sling chain—greatest strength, maximum safety, lighter weight, handling ease, resistance to wear, minimum cost against service life.

Because they found all these advantages in HERC-ALLOY by on-the-job experience, it became a matter of course to prefer and specify HERC-ALLOY Sling Chains.

Write for illustrated Data Book No. 3 which contains helpful information on sling chain selection and use.

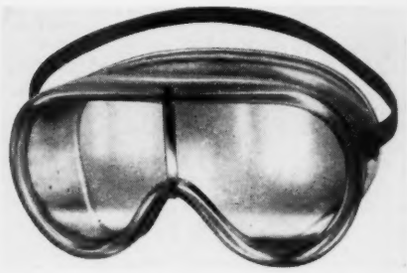
COLUMBUS McKINNON CHAIN CORPORATION
(Affiliated with Chisholm-Moore Hoist Corp.)
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.
District Offices: **New York • Chicago • Cleveland**
Other Factories at Angola, N. Y., Dixon, Ill., St. Catharines, Ont., Can. and Johannesburg, South Africa.

(Continued from page 242)

A toggle switch permits independent operation of the lamp circuit. Each circular chart instrument is equipped with a 4-w, 6-in. lamp. Strip chart instruments contain 8-w, 12-in. lamps.

For More Details Circle No. 19—Page 237

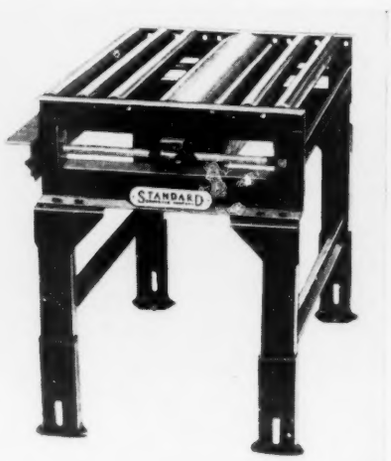
Goggles: Watchemoket Optical Co. Inc., Dept. N41, 232 West Exchange St., Providence 3, R. I.—Goggles feature extra-wide lens, improved nose bridge design and soft plastic



frame. Weight is evenly distributed to avoid "heaviness" at any one point. Lenses are said to exceed federal specifications for impact resistance and clarity. They are easily replaceable, yet can't come loose accidentally because metal lock bars hold them tightly. Clear or colored lenses are available. Frame is well ventilated, and models are available with special or no ventilation. One model has methyl methacrylate lenses for maximum impact resistance.

For More Details Circle No. 20—Page 237

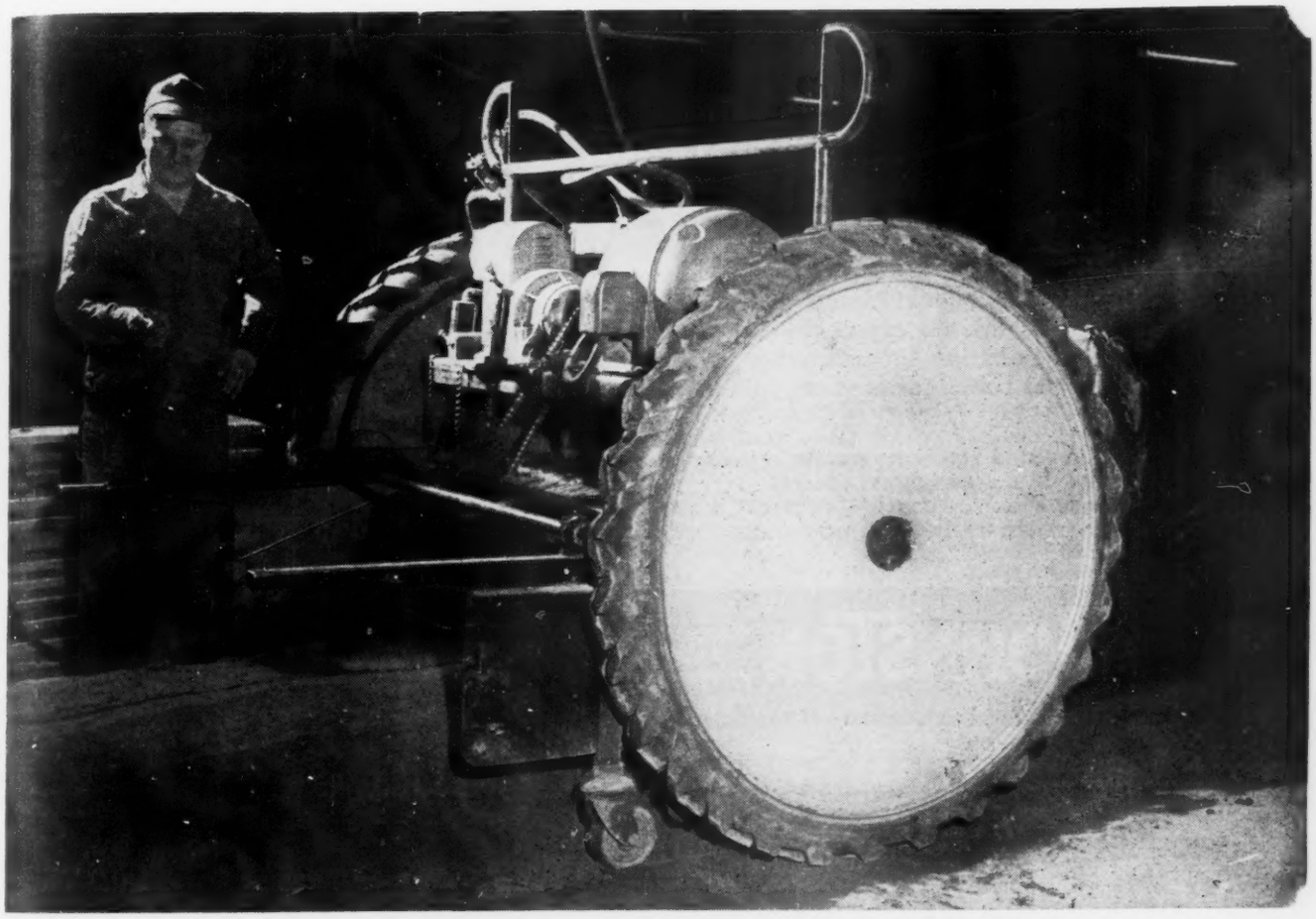
Conveyor: Standard Conveyor Co., 315 Second Ave. N W., North St. Paul 9—Conveyor which will handle 1000-lb belt pull is new companion to



company's older model which handles 400-lb belt pull. New unit will pull a 15,000-lb total load on a belt conveyor 150 ft long. Precision bearings are used at all drive and take-up shafts to minimize friction. Unit's

(Continued on page 246)

IN TUNE WITH THE TIMES WITH *"The Moulders' Friend"*



Costs rise higher and higher every year. To keep in tune with the times we must find cheaper ways to do the job better.

Foundrymen who use The Moulders' Friend sand conditioner agree that the thousands of flat tempered steel wires in the brush revolving at high speed do the most thorough job of mixing and aerating sand heaps on the foundry floor.

The Moulders' Friend is completely self-propelled. It has a capacity of two tons of thoroughly conditioned sand per minute with travel speeds up to 50 feet per minute. One man does the job.

A screen for removing trash and tramp iron and a water dispenser for accurately wetting down the sand as the machine travels over the heap are valuable added features.

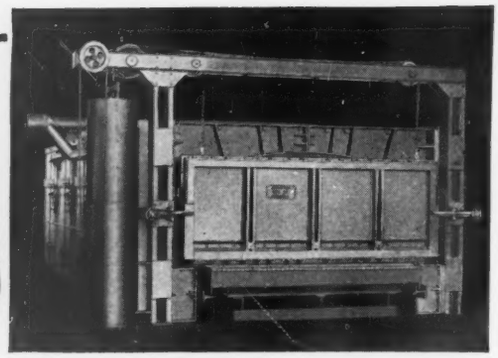
The Moulders' Friend fits your foundry. Being carried on two large wheels it turns short and handles well in the crowded foundry.

The Moulders' Friend will help you keep in tune with the times by paying for itself with better castings and less labor cost. Investigate this remarkable machine today. See one in operation.

THE BRUSH DOES THE JOB

"The Moulders' Friend" • Dallas City, Illinois

FOR NORMALIZING ANNEALING AND ALL HEAT TREATMENT OF CASTINGS



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You'll get clean heating, high efficiency, and fuel economy in the Johnston furnaces. Engineering experience is also apparent in their smooth mechanical operation—in their roller bearings in car and door hoist shafts, and power operated car pullers. Write today for bulletin F-240.

JOHNSTON EQUIPMENT FOR THE FOUNDRY
• MELTING FURNACES • HEATING TORCHES • LADLE HEATERS
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SEMET-SOLVAY FOUNDRY COKE

"for Better Melting"

What is "better melting"? It's melting your iron hotter, cleaner, faster. It's what you get when you use Semet-Solvay Foundry Coke in your cupolas. It is responsible for better castings and lower scrap losses.

SEMET-SOLVAY DIVISION
Allied Chemical & Dye Corporation
CINCINNATI • DETROIT
BUFFALO • CLEVELAND
In Canada: SEMET-SOLVAY COMPANY, LTD., TORONTO

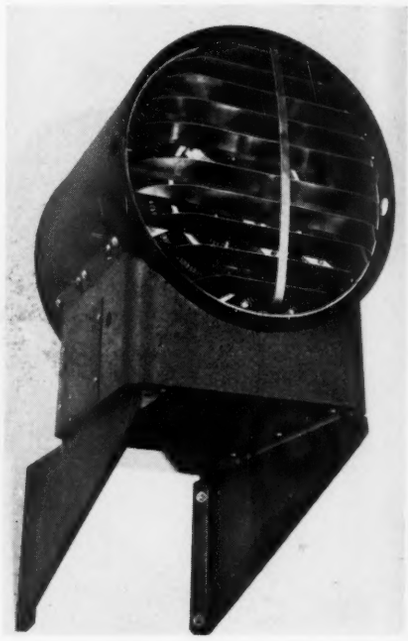
for Better Melting

(*Continued from page* 244)

design is a standardization of drives, takeups, end roller assemblies, intermediate frames, bearings, rollers and supports. A group of these units is claimed to provide a system comparable to a custom built installation.

For More Details Circle No. 21—Page 237

Electric Heater: Edwin L. Wiegand Co., 7596 Thomas Blvd., Pittsburgh 8—Large 20-kw model suitable for floor, wall or ceiling mounting has been added to the company's series of floor-type, electric unit



heaters. This heater, like the others in the series, can be used to provide the basic heat source in an office or factory or to supplement the central heating system. It also is used where precise temperature control is important for production, storage, curing, and other purposes. Adjustable louvers can be tilted to deflect the warm air stream up or down about 20 degrees. The heater operates on either 230 or 460 v single or three phase. Overall dimensions of the 20 kw model are 17 x 21 x 21 in., and the weight is 79 lb.

For More Details Circle No. 22—Page 237

Casting Repair Metal: Alvin Products Inc., 20-22 Houghton St., Worcester 4, Mass.—Moldable metal spreads like paste, applies easily with putty knife or similar tool and forms a permanent bond, according to manufacturer. Used to repair casting surface defects, it assertedly can be ground, drilled, tapped, sandblasted and shotblasted without pulling out or powdering off. It also can be used to repair or change coreboxes and wood or metal patterns. Company

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Eliminate the dangers of heat exposure for open-hearth men, others who work with high temperatures! McDonald asbestos hood covers head, face and neck — insures safety! Handy knob control adjusts size. When not in use, hood may be hung from convenient storage loop in crown.

WRITE TODAY for information on McDonald Asbestos Hood or other items in the complete McDonald line of safety clothing. No obligation.

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gives these specifications for it: Hardness, 4 to 8 Rockwell E; tensile strength, 650 psi; specific gravity, 1.85 at 75° F; weight, 1.1 oz per cu in.; when dry and hard withstands heat to 350° F; acid resistance good; attacked slowly by alkalies only after extensive immersion. The metal flexes to match expansion or contraction of parent metal, does not separate and is not attacked by alcohols, toluene, ether, or petroleum solvents.

For More Details Circle No. 23—Page 237

Safety Shoes: Safety First Shoe Co., Dept. N46, Holliston 5, Mass.—Air-cushion innersoles made of foam latex are a new feature of several steel-toe safety shoe styles manufactured by the company. The innersoles are included in three styles of dress shoes for executives and foremen as well as in several types of regular work shoes. The foam latex construction consists of thousands of tiny air cells which "breathe" to provide resilient, protective comfort.

For More Details Circle No. 24—Page 237

Lift Trucks: Hyster Co., 2902 N.E. Clackamas St., Portland 8, Oreg.—Company offers two new fork lift trucks, one of 6000-lb capacity, the other of 8000. Both are gasoline-powered and mounted on pneumatic tires. Designed as an ideal "outside" truck, the 8000-lb model can be operated efficiently indoors, too. The 6000-lb model, shown here, incorporates all the heavy-duty features of the larger truck, but with shorter wheelbase, width and overall length. Features of both include a long life clutch that can be completely removed or installed in less than an hour and heavy-duty, disk type industrial brakes.

For More Details Circle No. 25—Page 237

Traffic Markers: Campro Sales Co., Industrial Products Division, 1300 Fourth St. S.W., Canton, O.—Tapered plastic disks 3 in. in diam are used to mark traffic lanes on floors or roads. The yellow or white disks taper up to a ¼-in. height at

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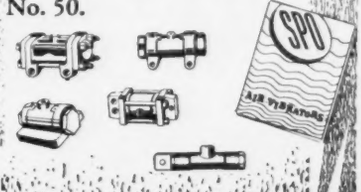
AIR
VIBRATORS

HIT HARDER
LAST LONGER
COST LESS!

Superior performance . . . maximum life . . . minimum cost . . . these features make SPO the best buy in air vibrators. You can depend upon these sturdy units to supply powerful, high-speed blows —day after day—for all your foundry vibration needs.

Key to SPO vibrator superiority is a special corrosion-proof bronze alloy cylinder liner which assures full-power starting, high-speed operation, low air consumption and maximum service life.

Whatever your vibration requirements, SPO has a model that will do the job.
For complete information, write today for Bulletin No. 50.



BLOW for
BLOW . . .
You can't
beat a SPO

SPO
749-SI

INCORPORATED
6449 Grand Division Avenue
Cleveland 25, Ohio

the center so that they warn vehicle operators by both feel and sight. They are injection molded, solid color throughout, affected little or not at all by oil, grease, hydrocarbons or ordinary cleaning solvents. Easily applied to floors or roads, they are usually spaced about 24 in. apart.

For More Details Circle No. 26—Page 237

Fire Extinguisher Cart: General Detroit Corp., 2272 East Jefferson Ave., Detroit 7, and General Pacific Corp., 1501 East Washington Blvd., Los Angeles 21—Fire extinguisher cart equipped with three different kinds of extinguishers designed to combat all types of fires can be wheeled easily to emergency area. A vapor-liquid extinguisher is for use with fires caused by gasoline, oil, grease, paints and other inflammable liquids originating either in open vessels or floor splash fires. A dry chemical extinguisher is for all types of electrical fires, and a water type with an anti-freeze charge which permits outdoor cold weather use is for fires caused by wood, paper, textile or rubbish. A fog type may be substituted for the water extinguisher if danger of electrical, gasoline, oil or paint fires is exceptionally great.

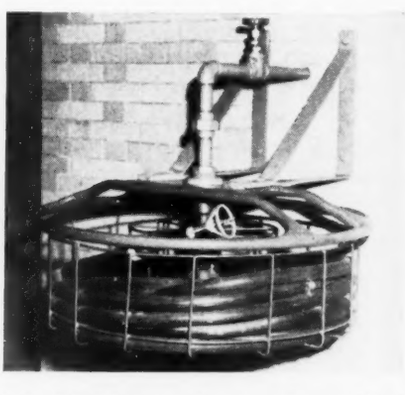
For More Details Circle No. 27—Page 237

Load Carriers: Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15—Extra-heavy duty load carriers in capacities up to 36,000

lb are designed to handle large, bulky industrial loads such as crated machinery. Loads are moved on and off carrier by fork trucks or cranes. The truck features four-wheel power steering. Where extra-large loads are handled the driver can turn around and drive the truck backward for better visibility.

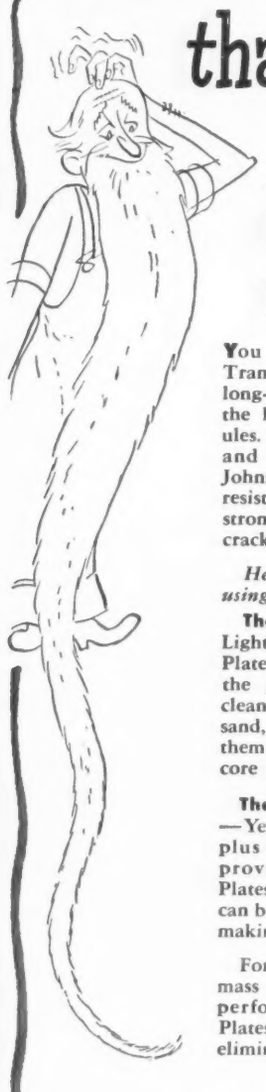
For More Details Circle No. 28—Page 237

Hose Reel: Zierden Co., 3815 South Kinnickinnic Ave., Milwaukee—Hose reel and fittings now are available with five kinds of mountings to facilitate storage and use of



industrial hose. Types of mounting include through-the-wall, through-the-floor, regular, island and overhead. The reel is formed of welded heavy gage wire. Welds are ground to prevent hose damage. The reel spindle is equipped with ball bearings. Water, steam and air flow through this spindle. Permanent pipe connections are made to

Looking for core plates that LAST LONGER?



. . . then use TRANSITE CORE PLATES that stay on the job year in, year out

You can rely on durable Transite* Core Plates to give long-term service, even under the heaviest foundry schedules. Made of fibrous asbestos and cement, by a special Johns-Manville process, they resist shock and corrosion, are strong and durable, will not crack or break easily.

Here are more reasons for using Transite Core Plates:

They speed production—Light-weight Transite Core Plates are easier to handle on the job. They're easier to clean, too . . . core wash, sand, etc., do not adhere to them as readily as to other core plate materials.

They maintain accuracy—Years of foundry service, plus exhaustive tests, have proven that Transite Core Plates do not warp readily . . . can be used for precision core making indefinitely.

For core plates of large mass and small surface area, perforated Transite Core Plates are also available to eliminate green cores and reduce baking time. For full details, write Johns-Manville, Box 60, New York 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

*Reg. U. S. Pat. Off.

Johns-Manville TRANSITE CORE PLATES

Made of Asbestos

the spindle housing and the hose connections at the lower end of the spindle tube. The spindle is self-sealing and does not require take-up adjustments to prevent leakage.

For More Details Circle No. 29—Page 237

Dust Collectors: Torit Mfg. Co., 301 Walnut St., St. Paul 2—To meet requirements of heavy-duty, continuous grinding and other high dust volume applications, the company is producing several models of its dust collectors, in both cabinet and cyclone types, with hopper bottoms and special release valves. Low cost, easily replaced nylon diaphragm valves are used when dust is grainy. When dust is sharp, a plate valve is used, hinged to the bottom of the hopper and faced with rubber.

For More Details Circle No. 30—Page 237

Barrel Pump: Engineered Equipment Co., Box 207, Warsaw, Ind.—Barrel pump will handle wide range of fluids, including viscous or oily

liquids such as linseed oil or core oil. The handle is turned in one direction to drain barrel, in the opposite to fill it. Spout is threaded for ¾-in. ID hose connection. The pump empties a 55-gal drum in 8 to 10 minutes. Combination 1½ and 2-in. bung nut is furnished. Fits ¾-in. suction pipe. The 8-lb unit is self-priming, continuous flowing and non-dripping. Spout can be turned up to receive solvent or detergent for back flushing.

For More Details Circle No. 31—Page 237

Conveyor Belt: New York Belting & Packing Co., 1 Market St., Passaic, N. J.—Conveyor belt, which manufacturer describes as virtually rip-proof, is designed particularly for use where belts are subject to severe ripping or tearing action by foreign

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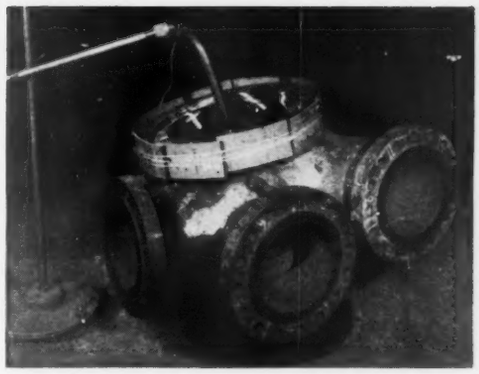
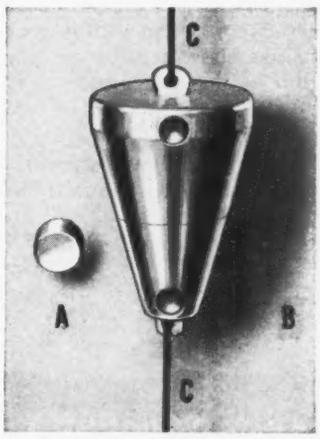


Radiographing a flange on a heavy steel casting.



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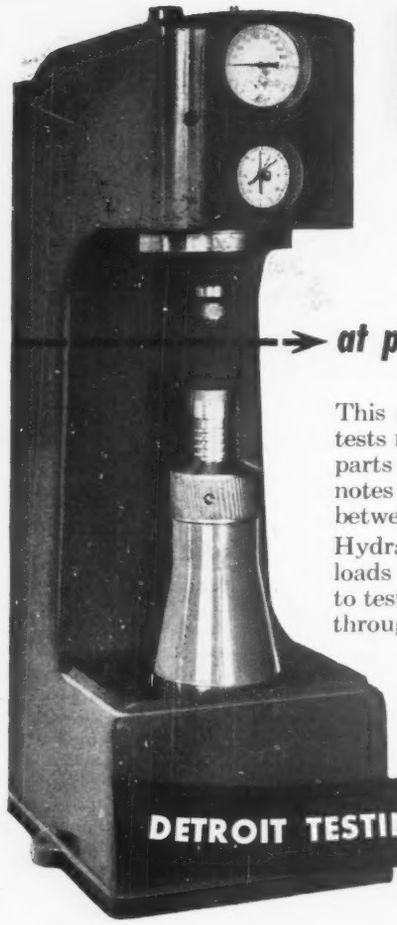

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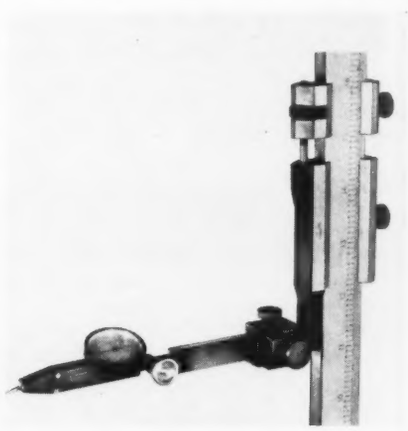
objects. Special carcass has multiple strands of high-tensile-steel wires imbedded at 3-ft intervals. If the belt should be punctured, the construction limits tearing to a maximum of 3 ft lengthwise. In foundries the belt has been used where shake-out belts are subject to damage from hot, sharp pieces of metal.

For More Details Circle No. 32—Page 237

Height Gages: Homestrand Inc., Larchmont, N. Y.—Several improvements have been made in the company's 12, 18 and 24-in. height gages to increase the instruments' versatility and utility and to save time and effort for the users. A newly designed universal clamp eliminates the need for an extra attachment when dial gage use is necessary. The marker has been modified to be used with a depth measuring rod attachment without the use of an extra clamp. Attachment arms are now identical in size for both 18 and 24-in. gages. Illustration shows gage used with dial indicator.



For More Details Circle No. 33—Page 237

Water Cooler: Westinghouse Electric Appliance Division, 653 Page Blvd., Springfield 2, Mass.—Remote type water cooler can provide 50°F drinking water to several wall fountains. Air-cooled model for stores and offices will supply 12.1 gph at 50° F when the inlet temperature is 70°F and the room temperature 80°F. Water-cooled model for factories will supply 21.2 gph under similar conditions. Water cooling chamber of both models is of brass with heavily tinplated interior surface. The refrigerant flows through copper coils. The chamber is insulated by granular cork sealed in an air and moisture-tight enclosure. All water-carrying parts are insulated to eliminate sweating.

For More Details Circle No. 34—Page 237

"Ideal" Steel Foundry

(*Continued from page* 89)

delivered to the large mold bay by the extended sand belt. Not only does the small mold unit receive the advantages of all-mulled sand, but the same advantages are obtained in the large mold bay.

Space consuming sand piles are eliminated in the large mold bay and housekeeping is greatly improved. Then, of course, as you may already have guessed, the extension of the mulled sand belt and the shakeout will fit directly into future mechanization of large molding in area "one."

Pay-as-you-go Mechanization — Of course, a step-by-step, pay-as-you-go mechanization plan is only successful when each step can justify itself not only as a part of the long range plan, but also by immediate results. Let us check these results against the cost of this installation.

A ten-station molding line, like the one installed, with the mulled sand system, including the shakeout, will cost approximately $14,000 per station. Excavation for the shakeout and shakeout sand belt could be completed before the old foundry building was extended to cover this area. Thus, this construction would be relatively inexpensive and the added length of the shakeout sand belt would not add greatly to its cost. The extension of building chargeable to the sand system would add between $10,000 and $15,000 to the cost.

Roughly, this entire phase of our mechanization program would involve an expenditure of between $140,000 and $155,000. It is interesting to note that additional molding stations built to the left of the present stations would cost only $5000 to $7000 each, provided that mulling capacity was sufficient. This is a strong argument for providing ample mulled sand capacity, and in this installation provision has been made for a 30-ton-per-hour unit.

Now let us check the results that will be obtained to see if we can justify an expenditure of up to $155,000. The number of molders in the small mold area will not be increased since under ideal operating conditions only eight of the ten stations would be operated. Thus there would be still only eight molders in this area. But, with this mechanized set-up, the six men on the jolt squeeze molding machines should be able to produce 170 molds each, with a finished casting weight averaging 12 lb. The cope and drag team of two men should be able to produce approximately 200 molds with an average finished casting weight of 40 lb.

This gives us a total daily production of approximately 18,000 lb of finished castings. Production has been increased almost three times without an increase in molding manpower. With provision for all-purpose molding sand, overhead sand handling, molding hopper sand delivery, and conveyorized mold handling, this 3 to 1 increase is not an exaggeration.

To obtain the same increase in production without this contemplated mechanization would require at least 16 additional bench and machine molders using the old methods. With the improved sand practice and the elimination of facing sand it should also be possible to reduce the night crew by at least six men and eliminate two day crew sand handlers. Three of these men would be needed to pour molds since molders would no longer pour their own.

Thus, assuming the increased production is justified by demand, there is a potential labor saving of at least $50,000 a year and the men thus released can be utilized to handle the increased tonnage in the cleaning room. Even if we disregard the great-

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er profit that will be obtained from the expanded production, it should be possible for this mechanization to completely pay for itself in three years, which by modern standards is considered very satisfactory.

Using All-Purpose Sand—We spoke of the saving to be obtained from the use of a single, all-purpose molding sand throughout the foundry with the elimination of special facings. Many experienced steel foundrymen scoff at the possibility of a single all-purpose sand, and not without good reason, considering all of the unsuccessful attempts at such a practice. However, the fact remains, that several steel foundries are very successfully applying a single, all-purpose sand practice.

One such successful sand mixture is in use in a steel foundry producing the same range of jobbing work as in our example. This mixture is made up of ten parts of system sand with one part of new sand and additions of 0.5 per cent of western bentonite and approximately 0.1 per cent of silica flour, corn flour, and molasses. The sand is basically a five-screen mixture with an A.F.S. fineness of 40. It has a green strength of 5-7 psi, a permeability of 200 and a moisture held between 3 and 3½ per cent. It might be well to repeat that this is the only sand being used in this steel foundry and that the results are highly successful. An inflammable mold wash is used, and all molds are skin-dried by igniting this wash a few moments after application.

Increase Coreroom Capacity — At the outset of our mechanization, it was necessary to consider carefully where mechanization would begin. However, the following steps in the program will, in all likelihood, present themselves. It is obvious that to produce the far greater quantity of small molds, additional coreroom capacity will be essential; consequently we can turn our attention to the coreroom shown in Fig. 6 for the next mechanization step.

The coreroom was moved from the small mold bay to a separate building to provide room for expansion in the molding department. Thus, it was possible to reconstruct the coreroom according to the needs of the ideal steel jobbing foundry. Although core blowers are generally considered production foundry tools, more recently jobbing foundries have been realizing very impressive savings with blowers. Such things as quick-change blow plates and corebox clamping devices have made blowers highly flexible.

For this reason, in our ideal foundry, we have installed three core blowers with blown core capacities of from 20 to 30 lb. These blowers will handle the major part of the foundry's core production, but some core bench work will still be necessary. Because of the short-run nature of much of the work coming into the foundry and the nature of the corebox equipment submitted with patterns, it is practically impossible to eliminate core bench work completely.

Both the blowers and the benches will be served by a continuous belt conveyor which will carry the cores to a racking station. There they will be placed on core racks and carried to the batch-type core ovens. Here again is an opportunity for great improvement in product quality. Assuming that the old core ovens were of non-recirculating design, we now can install two modern recirculating-type core ovens. These should cut the baked core reject rate by as much as 40 to 50 per cent.

Mull Core Sand Separately—Core sand will be mulled in a separate core sand muller and delivered to the blowers and benches by means of an overhead platform. Both benches and blowers are provided with overhead sand hoppers which not only permit

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higher core production, but generally improve coreroom housekeeping by eliminating sand piles. This arrangement is shown in Fig. 7.

Although the platform sand cart method of core sand delivery might seem clumsy at first glance, it does offer considerable flexibility when different types of core sands are used. Not only that, but with the core sand muller raised to the same level as the platform, it is possible for a single operator to mull all core sand and to deliver the mulled batches to the various core-making stations. In this first phase of coreroom mechanization, temporary core sand storage has been provided in a small shack outside of the coreroom building. A skip hoist is used to raise the raw sand from floor level to a small hopper above the muller. This rather clumsy method will be replaced in a later mechanization step by silo storage and direct belt delivery. As our plans unfold you will see how this early stage fits directly into future planning.

Recapitulates Costs

It might be well at this point to see if we can justify the expenditure for our new coreroom facilities in the same manner in which the molding facilities were justified. Because of the lightly cored nature of the work, a relatively simple coreroom will suffice, and the expenditure will not be too great. A small high-speed muller with a capacity of approximately 7 tons of core sand an hour can be purchased and installed for approximately $6000. The sand delivery platform can be constructed by the foundry organization itself for a cost approximating $5000.

The three blowers, the two core ovens and miscellaneous other equipment will cost between $20,000 and $25,000. Cost of all equipment should total between $30,000 and $35,000.

The cost of the building will be slightly less than $45,000, but all of these expenditures cannot be charged to coreroom expansion. A primary reason for constructing a new coreroom was to provide added space in the molding department. However, assuming that half of the cost of the new coreroom can be charged directly to coreroom modernization, the total cost of this mechanization step will be in the neighborhood of $55,000.

With core blowers and with modern core delivery and handling, it should be possible to quadruple core production with the same number of men. Such an increase in production using the old bench core making methods without mechanized handling equipment would require at least ten additional men. Thus, there is a labor sav-

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ing of at least $30,000 a year, and the new coreroom will pay for itself in about two years.

This speedy investment-return does not take into account the improved quality that will be made possible by careful core sand control, high quality blown cores and modern core ovens. When core blowers are used, it also will be possible to realize important additional savings, since it is often feasible to blow complete core assemblies which would require many hours of hand finishing and assembling if the same cores were made on benches. It is also possible to use less skilled labor on core blowers than would be necessary at core benches.

Although it is quite possible that additional production could be obtained if a vertical-type continuous core oven were used, such an oven might not be suitable for a strictly jobbing steel foundry. The great variety in size and section of the cores produced necessitates varying baking cycles, and this one factor almost immediately rules out a continuous type oven. It is also possible that the investment in a continuous vertical oven could not be justified by the production realized in this coreroom. On final consideration the batch-type ovens were chosen because of their inherent flexibility and relatively low cost.

Expand Cleaning Department—Like our second mechanization step, the third step is also apparent. The greatly increased production of small molds will necessitate extensive expansion of the small casting cleaning department. A proposed layout for this department is shown in Fig. 12.

In a steel foundry, particularly in a steel jobbing foundry, even the most compact and efficient cleaning room layout will occupy as much space as the molding facilities. Often the man-hour-per-ton *cleaning* rate will be equal to the man-hour-per-ton *molding* rate or more. No matter how carefully a cleaning room is laid out, it is practically impossible to eliminate the extensive rehandling of castings inherent in steel foundry cleaning practice. For this reason it is of first importance in the cleaning room to provide complete flexibility for handling castings. When this consideration is combined with that of providing a smooth flow of work through all stations, a *good* cleaning department layout can be established. However, the *ideal* layout at best can only be approached.

In our model cleaning room we have resorted to roller conveyors, special casting tote boxes, and overhead cranes to ease our handling problems. Two small craneways run the length of the cleaning room on either

side, to serve the various stations. Another small crane of a similar type serves the airless shot-blast barrel and the continuous annealing furnace.

The central shakeout for handling the small castings was installed in the large mold bay so that in the future, large molds could also be provided for. An apron conveyor was installed between this shakeout and a tote box loading station in the small casting cleaning room. After shakeout, the small castings slide down the inclined shakeout grating onto the apron conveyor and are loaded into the tote boxes in the cleaning room.

These tote boxes are in turn carried to an airless shot-blast barrel for a first cleaning before gates and risers are removed. It is considered the most modern practice to clean the castings first, before any other step in the finishing process is taken.

Use Special Tote Boxes

Castings are loaded into special tote boxes (Fig. 13) after blasting and are carried by crane to the burning stations. They are set on an inclined roller conveyor at a convenient working height above floor level. Then a quick-action release device allows the entire side of the tote box to swing open and permits the castings to be discharged onto individual work tables. As the tote box is lifted and carried away, the open side may be clamped shut again.

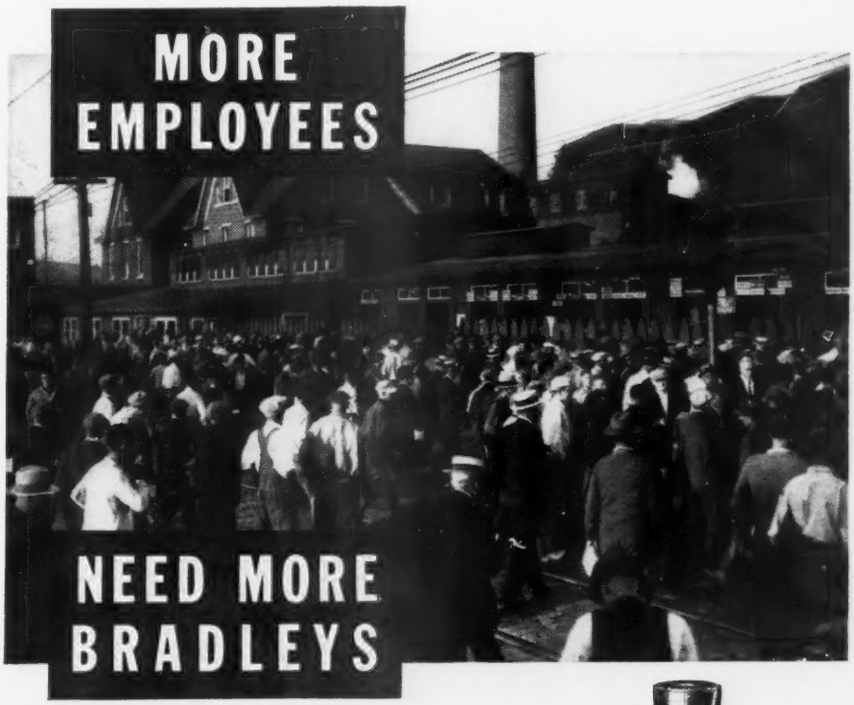
The special casting tote boxes are also used between the sorting stations and the rough grinders, where work tables are also provided at a convenient height. After burning and sorting, the castings are delivered to the grinding stations and then to a continuous annealing furnace on a series of roller conveyors.

Provision is made after grinding for the special heat treatments which will be necessary for certain castings. A special heat treating department is located adjacent to the grinders, and batches of castings may be delivered to the furnaces by means of the overhead bridge crane. Recirculating salt baths are provided for quenching the castings as they are removed from the heat treat furnaces.

Assuming that at least half of the castings produced will be within a sufficiently narrow size and analysis range to permit a uniform heat treatment, a continuous annealing furnace may be justified. Such a continuous furnace is shown in Fig. 12. Castings will be discharged from the annealing furnace directly into casting tote boxes, and castings from the special batch heat treating department will also be delivered to this station. There the castings will be charged into the airless blast barrel for a second blast cleaning.

Chipping, inspection and finished grinding operations will follow the second blasting of the castings. Again the quick-release tote boxes will be used to transport the castings to the various stations. Some castings will be transported from the chipping, inspection and final grinding stations to presses for straightening which will be served by roller conveyor to simplify handling. A single welding department, located in the large casting cleaning room, will serve both the large and small casting cleaning departments. A small roller conveyor is provided for bay-to-bay handling of castings.

Successful cleaning room operation, particularly in a steel foundry, is not so much a matter of process as it is of handling between processes. Because of the extensive amount of rehandling necessitated by special heat treatments, additional shot blast cleanings, regrinding, and straightening of castings, routing can become difficult, comparable to an Army logistics problem. Under these circumstances



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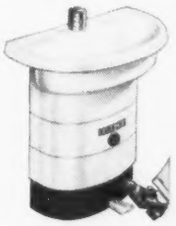

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a routing card system is very helpful. Each batch of castings should be accompanied by a routing card which designates the various stations to which the batch of castings must go before reaching final inspection.

Mechanizing the cleaning room is, of course, expensive. Major pieces of equipment include the airless shot blast barrel, the continuous annealing furnace, and special heat treating and quenching equipment. However, such modernization can easily justify itself. When a steel foundry expands its production of small castings, many really troublesome problems will be in the cleaning department. If these problems can be avoided, and if at the same time increased quality can be realized with greatly increased capacity, there is ample justification for major expenditures.

In this case, equipping this department will cost approximately $130,000. The extension of the building will run close to $50,000. Thus, a total expenditure of $180,000 will have to be made. However, all stations in the new cleaning department can be manned with about 24 men. If we assume that an expansion of capacity in the cleaning department without any modernization could be accomplished with no greater efficiency than the old cleaning room was operated, this 24-man figure represents a saving of 20 or more workers. Thus, in wages saved alone, the cleaning room mechanization will pay for itself in about three years. With our present plant modernization standards, this is considered satisfactory.

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Good Cost Methods

(*Continued from page* 103)

mation that will tell management both what it does cost and what it should cost to produce individual jobs. Only a solid knowledge of this kind will safely tell management when to refuse an order and why. Further, they permit the establishment of activity standards both for the individual company and for the industry against the performance of which the company compares its own actual performaces. Such comparisons often will uncover weak places in their organization, lead to reduction of costs and produce profit.

It is not enough to run a foundry efficiently for if a company is not as conversant with its costs as it should be that ignorance of costs can be a decided factor in demoralizing a group market and make it impossible for either itself or its competitors to earn a fair profit.

A foundry should solicit business and accept orders only for castings that it is equipped to produce efficiently, at a profitable return on capital invested or, in periods of low industry production, at a return that will recover wholly or in part the fixed cost of operating the foundry. To achieve such a return, basic cost principles must be adhered to.

Since the purpose of business is service, its existence cannot continue indefinitely without profit. Profit can be realized only when there is good merchandising, and good merchandising must be predicated on knowledge of the potential market, intelligent and accurate cost information, and a goodly amount of "intestinal fortitude" in the establishment of sales policies.

No matter how busy an executive is, he must devote a considerable

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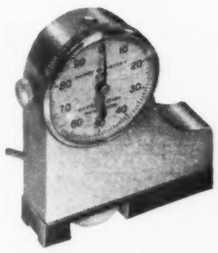
Use the Green Hardness Tester to find the right hardness and control at that value for improved casting quality.



No. 673 DRY HARDNESS TESTER

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portion of his time to a consideration of company profits. He must determine the source of these profits as well as their size, in order to shape intelligently the best policies for his particular business. To do this he must satisfy himself that the costs and other statistical information furnished him is fundamentally sound.

Two distinct types of buyers do business with foundries. One sends a print of a casting, or perhaps the pattern, to a foundry and asks for a quotation for each separate job. The other brings in a collection of prints or patterns, covering a variety of weights, shapes and metal consistencies, and asks for a blanket price per pound covering all the patterns or groups of patterns.

The first, by his action, admits he is shopping for a favorable price. The second type conveys the idea that he is willing to let the foundry make profit enough on the easy jobs to compensate for losses on the hard ones. Suppose the buyer of the second type decides to "shop" for prices on individual patterns. If the supplying foundry does not know the cost of each kind of casting in the group, it may lose the orders for the profitable jobs and be left with the unprofitable ones.

Prices Fair to Both

The foundryman who bases his estimates on fundamentally sound cost accounting has the knowledge which, coupled with good business sense, contributes to establishing sales prices that are just to the customer and profitable to the castings manufacturer.

Foundry executives often say, "Market sets the price, so why should I bother with cost?" Market may set the price, but the foundryman is not compelled to take a job that will not return the profit he thinks he should have. In fact, the main purpose of his using sound cost accounting fundamentals is to enable him to know accurately and definitely when to accept and when to reject business.

It must be admitted that cost estimating for individual jobs requires considerable effort, first in preparing basic data, second in using the data in establishing sales policies.

Probably no document in daily use by the foundryman excels in importance the estimate sheet. Upon it depends the whole fabric of a successful business career. A professor in economics once told his class that some manufacturers based their sell-

COST CONTROL
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NOMAD
CONVEYOR SYSTEMS

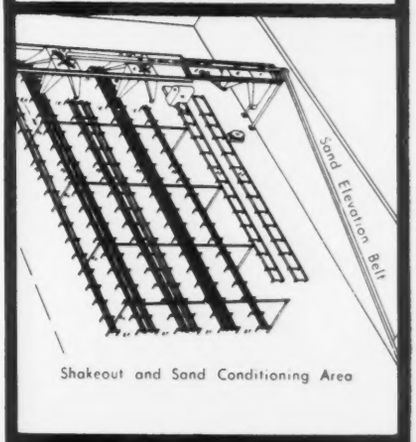

Illustration of conveyors serving 8 Squeezer Molding Stations. Note position of Sand Hoppers

LOW COST MECHANIZATION BOOSTS PRODUCTION

The trend in recent years has been toward mechanization — however, until NOMAD FOUNDRY EQUIPMENT was patented and marketed, the cost of conveyor equipment prevented the small and medium size foundry from considering it as a means of increasing production.

With an eye to accommodating requirements of this group as well as larger shops in the industry, we designed a SELF-CONTAINED AND SELF-SUPPORTED FOUNDRY UNIT. The unit consists of LIGHT WEIGHT BUT STURDY GRAVITY MOLD CONVEYORS, ROLLER-MOUNTED BOTTOM BOARDS OR PALLETS, AND A SAND DISTRIBUTION SYSTEM. The various items are of standardized basic design which can readily be adapted to the requirements of a given installation. A choice of the items can be as extensive or as limited as desired.

NOMAD FOUNDRY EQUIPMENT ENGINEERS are available to assist in laying out the equipment for you to make the most efficient use of your facilities. . . .

Write for information or literature TODAY.

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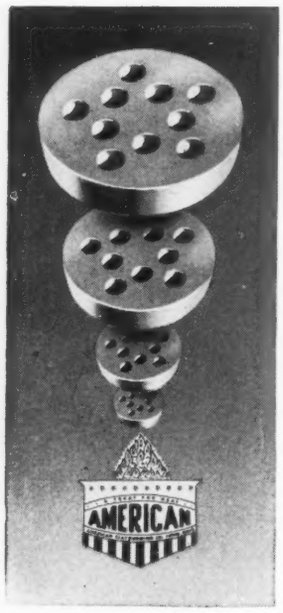
CUT CORE-MAKING COSTS!

Use AMERICAN CERAMIC *Strainer Cores!*



★ No need to tie-up expensive coremakers' time with shop-made "skim cores" . . . just use economical, easy-to-handle American Ceramic Strainer Cores.

Speeds production too . . . and remember, American Cores assure you of slag-free castings EVERY time.

American representatives will quote prices on any size Strainer Core.

Write today for samples and descriptive literature.

AMERICAN CLAY FORMING COMPANY
TIFFIN, OHIO ★ TYLER, TEXAS
National Sales Representative
Williston & Company, Delta, Ohio

MANUFACTURERS OF SPECIALIZED REFRACTORIES FOR OVER 30 YEARS

Eliminate 70% to 90% of Conveyor Downtime

Cedarapids
Schrock
Built by IOWA

MOTORIZED HEAD PULLEYS

eliminate maintenance on chains, belts, sprockets, Universal drives, countershafts, etc.

EVERYTHING is contained INSIDE the pulley shell!

HERE'S a money-saving departure from conventional conveyor drives. A Cedarapids-Schrock *Motorized* Head Pulley is simply a new application of the long-proven gear reduction drive, with everything . . . electric motor, reduction gears and all moving parts . . . contained inside the drum, completely protected from grit, dirt and weather and with no outside parts or motors to service. 70% to 90% of conveyor trouble and downtime is saved by eliminating the exposed parts necessary with conventional pulley drives. In operation, the pulley shell rotates about the electric motor which is held stationary by a torque arm attached to the conveyor frame. The speed of the shell depends on the combined reduction ratio of the pinions and gears inside the shell. Compact, easy-to-install, job-proved Motorized Head Pulleys are available in sizes from 5 to 30 HP and in various widths.

Find out all the advantages of converting your belt conveyor or belt-bucket elevator installations to *motorized* efficiency before you need head pulley replacements. See your distributor today, or write for Bulletin MP-1.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Built for sale in Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah and Washington by
YUBA MANUFACTURING CO.
(Pulley and Sprocket Department)
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ing prices on estimates while others established them on "guesstimates." Guesstimates, he said, "are only the mild vaporings of a credulous mind too often influenced by the price established by competition where the same methods are used."

Establishment of a dependable method for calculating costs of individual jobs in a foundry requires the application of common business sense coupled with the realization that averaging unrelated factors always results in misleading information. Many times, such misleading information does more damage to pricing policies than guesses do.

Foundrymen usually base their estimating data on normal operations, either by (a) averaging actual operating costs over past years; (b) using average tonnage shipped in periods of estimated normal operation; (c) using an arbitrary percentage of tonnage shipped in a specific previous period of highest production; or (d) consideration of the physical capacity of the foundry to convert metals into suitable castings for the customers use.

Averages Misleading

Averaging actual operating costs over past years is unsound because the average is very likely to be different from actual expenditures today. These differences are caused largely by improved operating facilities, methods of wage payments and types of castings produced, as well as by changed conditions in the foundry industry in general.

Using tonnage shipped in periods of estimated normal operation does not take into account the constant change in type of castings from year to year. For instance, the year selected as a basis for establishing normal operation might show a production of 500 pounds per molder day. Today the foundry might, either by increased efficiency of its men or by making a different-type of casting, produce 700 pounds per molder day. Neither does this basis take into account the variations in weight produced by different molders in the same day or by the same molder on different days.

Using an arbitrary percentage of tonnage shipped in any previous period of highest production is unsound for these reasons:

1. The selected period might not represent the highest possible production obtainable from operating facilities then being used. Also, the selected period might be a time when the demand for castings required op-

erating the foundry more or less than the usual working hours per day.

2. The tonnage produced in the selected period in comparison with the tonnage produced at present might be influenced by increased efficiency of facilities or operators—perhaps of both.

3. The type of castings produced in the selected period might have been so different in character as to influence the daily output.

It matters little whether a foundry makes a standard line of castings, does jobbing or combines both; similar operations are necessary to convert metals into finished castings. Therefore, the manner in which costs are determined would not vary greatly. However, the differences in facilities and methods used in different foundries or in the same foundry may have a decided influence on the production costs of individual jobs. For example, the same foundry may pour metal at the molder's floor on some types of work and convey the mold to the melting point on other types. Differences in facilities and methods of melting, coremaking, cleaning, and other operations may likewise influence the final cost of castings of different types.

Follow Sound Principles

In considering the foregoing, certain sound principles and procedures of cost accounting must be followed if management is to be enabled to establish sales policies that will permit it to meet competition intelligently and to secure maximum return on investment. Extreme care must be exercised that averages are used only where there is a definite relationship among the various elements of costs that go to make up departmental and production center rates.

The true measurement of any foundry operation depends on these factors:

1. The cost of operating a producing facility per hour, per month, per year, or per any other period that may be selected.

2. Production per hour, per month, per year or per any other period that may be selectd.

3 The hours, or fractions thereof, required for processing.

False assumptions based upon past performance usually prove a heavy handicap in setting sound sales prices for foundry work. Therefore, it behooves every foundryman to see to it that sound cost fundamentals be established and adhered to. The most important fundamentals are these:

1. Normal operation based on present operation facilities, instead of on past performance.

2. Cost of metal at furnace or cupola instead of distribution to jobs on the basis of good castings produced. Basing metal costs of jobs by good castings produced does not recognize variations in costs of remelting gates and sprues.

3. Allocation of core forming overhead on the basis of hours instead of on direct labor.

4. Allocation of core baking on the basis of furnace hours instead of including it in the overhead of the core forming operation.

5. Allocation of molding overhead on the basis of hours instead of on that of direct labor. Variances in rates caused by different methods of production should be taken into consideration as well as variances in molding operation facilities. (See "Distributing Overhead Costs by Production Centers," FOUNDRY, September, 1940).

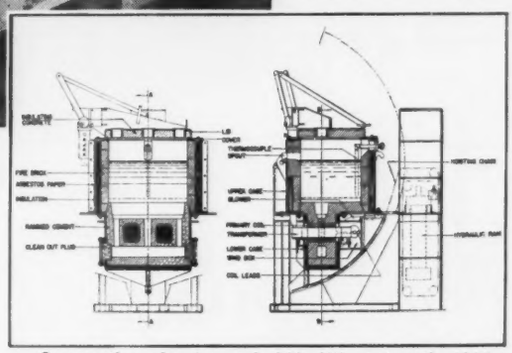
6. Attention should be given to

AJAX TAMA-WYATT INDUCTION FURNACES

Cut Foundry Melting Cost

Accurate records at the National Pressure Cooker Co., Eau Claire, Wisc., show that over a two-year period the AJAX Induction Furnace was capable of reducing melting costs by as much as 40%.

Partial view of National Pressure Cooker Co.'s melting room showing AJAX Induction Furnaces.



Cross-section drawings of 166 kW. twin-coil AJAX Induction Furnace with hydraulic tilting device, same as shown in photograph above.

Due to the nature of their use, pressure cooker castings must maintain exceptionally high standards of casting quality. Not only does the induction furnace effect a saving in melting cost but, in addition, working conditions are greatly improved.

Note from the diagram above that the operation of the AJAX Furnace is based on the induction principle, whereby energy is transmitted to the molten charge without actual contact, through the refractory walls. Only the metal is heated, and therefore there are no resistors or other parts having a higher temperature than is absolutely necessary for properly melting the charge. A gentle movement of the bath insures uniform temperature and homogeneous mixing of the ingredients. Linings are made of inert refractories which do not contaminate the melt. Temperature control is entirely automatic.

AJAX ENGINEERING CORPORATION, Trenton 7, New Jersey

AJAX TAMA-WYATT INDUCTION MELTING FURNACE

AJAX ELECTRO METALLURGICAL CORP., and Associated Companies
AJAX ELECTROTHERMIC CORP., Ajax Northrup High Frequency Induction Furnaces
AJAX ELECTRIC CO., INC., The Ajax-Hultgren Electric Salt Bath Furnace
AJAX ELECTRIC FURNACE CORP., Ajax-Wyatt Induction Furnaces for Melting

methods of cleaning castings, recognizing that there is no prevailing relationship between the time required to clean a casting and its weight. Neither is there any prevailing relationship between the time required to clean castings and the time or labor cost to set up the mold. Altogether too many foundrymen overlook the inaccuracies in the costs of individual jobs caused by applying cleaning costs on the basis of weight or as a percentage of molding labor. (See "Cleaning Costs," FOUNDRY, November, 1941.)

Since the foregoing costs accounting fundamentals are prerequisites of accurate and sensible cost estimating, the author presents the following for consideration:

1. Establishment of normal operation.
2. Analysis and distribution of cost elements.
3. Preparation of estimating bases.
4. Calculation of job costs and selling prices.

Normal Operation — Number of available working days for the 365-day year may be arrived at by the method indicated in Fig. 1. It should be understood that this is merely the method for arriving at available working hours; the figures must be adjusted to reflect the conditions of the individual foundry.

Since it is not possible to operate any facility in the foundry 100 per cent of the time, allowances should be made to reduce the available hours to the actual hours the facility is expected to operate. Such allowances are in no way connected with efficiency standards established to increase the number of units produced in a specified time. (See "Establishing a Normal Operation in a Gray Iron Foundry," FOUNDRY, August, 1947.)

Cast Elements—The very existence of any foundry may well depend upon how much intelligent effort it puts into analyzing the costs of the various activities of its business. (See Fig. 2) The wide-awake foundryman will make only such castings as his foundry is equipped to produce efficiently and will establish effective controls over waste. In other words, management of the company should protect the interest of the stockholders by seeing that a dependable basis is established for calculating the costs of individual jobs. This can be done only if every element of cost is analyzed and scientifically allocated to the activity (operation) causing it.

Seven operations are necessary to produce castings in any foundry: Melting, coreforming, corebaking, molding, shaking out, machine cleaning and hand cleaning. However, certain types of castings require additional operations such as heat treating, packing, etc. Some foundries also perform machining operations on their product. The costs of these additional operations are subject to the same cost accounting principles and procedures as herewith presented for the seven basic operations.

For the purpose of analysis of cost elements and the allocation of these costs to processing necessary for the production of castings, the cost elements are classified as building expenses, equipment expenses, supplies, labor and labor expenses. Such a classification is necessary because there is no single, justifiable basis for allocating these various elements of costs to processes.

Building expenses (A in Fig. 2) include expenses necessary to house the various activities of the business, including depreciation, property taxes, property insurance, repairs,

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STEARNS Lifting Magnets are being successfully and profitably used in handling scrap iron, steel plates, coils, bundles, strip steel, rails, slabs, billets, pig iron, castings, borings, turnings as well as finished products. The problem of loading or unloading . . . or moving large quantities of material quickly at a low cost — easily solved with STEARNS Lifting Magnets.

For the efficient handling of flat steel sheets, plates and regularly shaped steel bars and structural steel sections, be sure to investigate STEARNS Rectangular Lifting Magnets.

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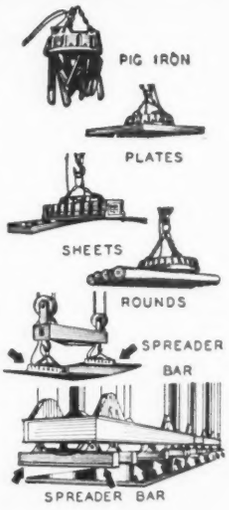

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maintenance, heating and lighting.

Equipment expenses (B in Fig. 2) include those necessary to operate and maintain tools to work with.

Supplies expenses (C in Fig. 2) include the cost of supplies used in operating the business.

Labor costs (D in Fig. 2) include the earnings of employees necessary to perform the various functions of the business.

Labor expenses (E in Fig. 2) include those that are related to labor earnings.

In allocating the expenses of a cost element or group of cost elements to processing operations (sometimes called cost centers), care must be exercised to see that the proper allocating base is used. Otherwise the rates used in estimating the costs of all jobs may be faulty, thus misleading management in its setting up sales prices, the most important function of the business.

Effective establishment of processing or cost center ratio demands the use of different bases for allocating operating expenses. The most important are:

(a) Direct to processing units or cost centers.
(b) Area occupied.
(c) Building values.
(d) Equipment values.
(e) Horsepower per hour of consumption.
(f) Tonnage produced.
(g) Direct processing labor.
(h) Direct processing labor-hours.
(i) Estimates based on intelligent analysis.

In his professional cost consulting service, the author recommends the use of a form shown in Fig. 3 for establishing normal operating (standard) cost for each processing unit or cost center. Single sheet is used for each class of expenses shown in Fig. 2. Each element of expense is first determined for the usual business cycle of one year, then reduced to one month or any other accounting period employed by the company (such as 13 four-week periods), the results being entered on the form provided for the particular class of expenses.

There are two types of expenses: (1) those that can be allocated direct to cost centers and are so charged on the "standard" cost sheet and (2) those that must be prorated to cost centers on some equitable basis, as previously explained.

Expenses to be charged direct to cost centers are entered in the "direct charges" column by accounts in the upper section of the sheet and by cost centers in the lower section of the sheet. The "total" of the entries

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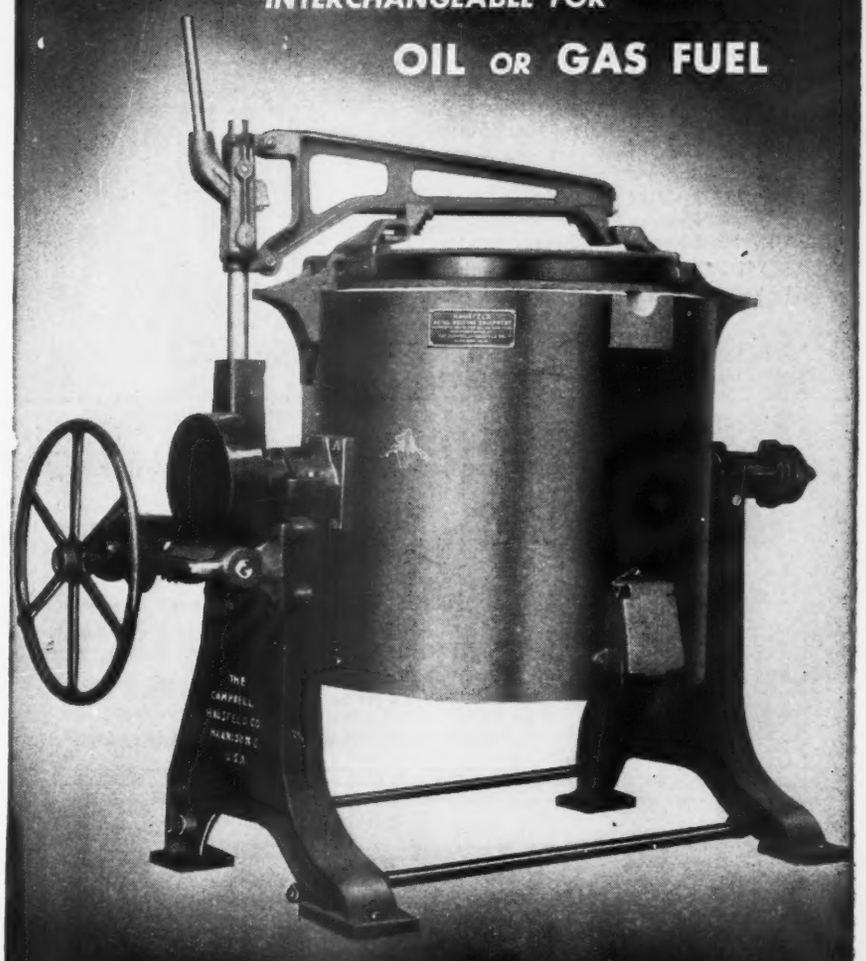

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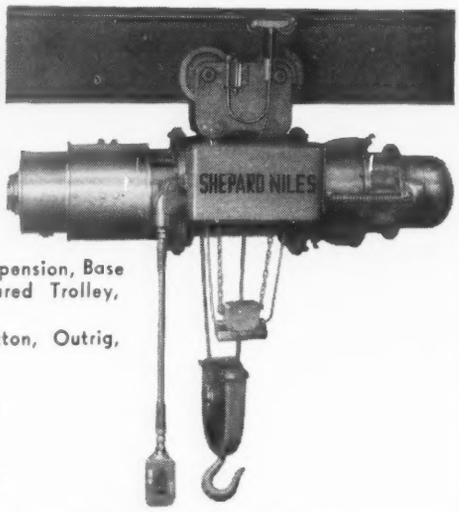
TWO FAMOUS HOISTS

Heavy-Duty SHEPARD NILES Hoist



TYPES: Lug Suspension, Hook Suspension, Base Type, Push Trolley, Geared Trolley, Motor-driven Trolley
CONTROLS: Pendant Rope, Push Button, Outrig, Remote
CAPACITIES: 500 to 40,000 lbs.
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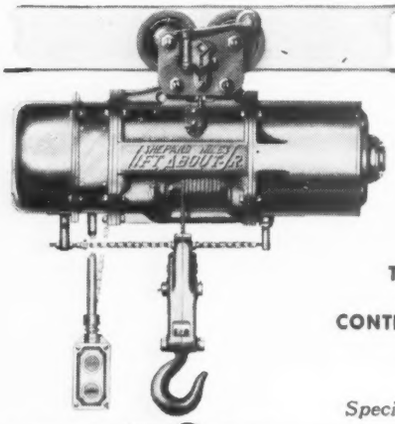

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CONTROLS: Single Speed, Push Button, Rope Control
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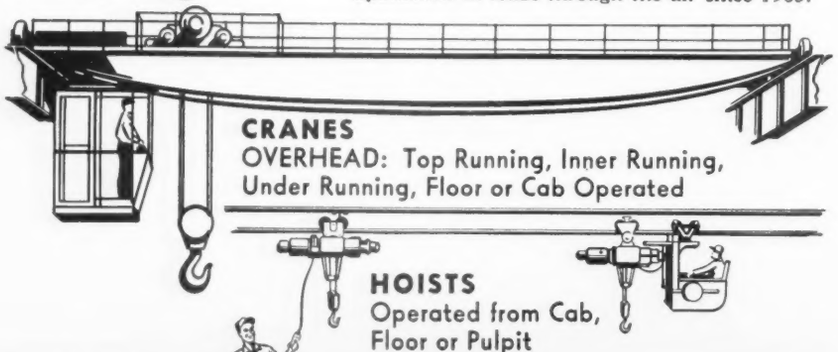
Specialists in loads through-the-air since 1903.



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to each section must be equal in amount.

Expenses to be prorated to cost centers are entered by accounts (cost elements) in the upper section of the sheet, totaled, and the total prorated to the cost centers. The "total" of the entries to each section must be equal in amount.

Direct and prorated amounts for each entry, both sections, are added and the sums carried to the "total" column of the "cost" heading of the sheet. The sums of each section must be equal in amount. Unit costs for each entry are then calculated, and the completed sheet placed in a multiple ring book, as illustrated by Fig. 3.

The multiple ring book (14 rings, ¾-in. center to center) allows space for inserting sheets for recording actual costs for three accounting periods. The forms for recording actual amounts are the same as those used for recording standard amounts.

This arrangement of standard and periodical statements in a multiple ring book allows for a quick and comprehensive comparison of each cost element by accounting periods and of each accounting period with the established standard, also by cost centers.

There is a trend among manufacturing companies, including foundries, toward quarter year comparisons. This comparison can be economically accomplished by establishing quarterly standards and actual quarterly amounts, and placing the sheets in a separate section of the multiple ring book, as illustrated by Fig. 4. The quarterly amounts for actual performance are the sum of the entries for the total accounting periods in the quarter, as shown in Fig. 3.

Sometimes it is desirable, and perhaps necessary, to revise standard costs on which rates are established to control profitable sales policies and the several activities of the business. Such changes might be indicated by:

(a) Changes in [illegible] of castings requiring new or different processing units.

(b) Marked changes in operating personnel, as well as in salaries and wage rates.

(c) Experience gained by analysis of actual performance.

Revision of standards could affect all the cost centers or a single center. In either case the revised standard is recorded on the same form as used for the first establishment, and the sheet or sheets superimposed on the original sheet or sheets. For detailed explanation of this method, see "The Accountant Reports to Management," FOUNDRY, January, 1951.

(To be concluded next month)

French Foundry Center

(*Continued from page* 107)

of precision scales, without vibrations or disturbance. In a gallery around the mechanical testing room are precision machine tools for the preparation of test pieces. A complete range of testing machines is provided, including an Amsler universal machine for tensile, compression, bending and shearing tests; two Dia Testor machines for hardness tests; a Le Rolland pendulum for measuring modules of elasticity; Alkan tables for fatigue tests; Chevenard dilatometers and other instruments.

The sand testing department comprises a complete range of equipment, including a Dietert machine for investigating the properties of foundry sands at temperatures up to 1500° C and equipment for the study of grain size, clay content, permeability and physical characteristics.

Analyze Any Product

One complete section is devoted to micrographic investigations. Another section, for spectrographic analysis, uses two spectrographs with different characteristics which, to a certain extent, complement each other. In this section, practically any foundry product can be analyzed qualitatively or, in many cases, quantitatively. A special installation has been made to provide for rating electric pyrometers. In the thermic testing department is the special section for testing domestic heating appliances.

The main laboratory installation at Sevres is not the only one at the disposal of the industry. Local laboratories for routine testing have already been in operation in various foundry centres, at Lille, Rouen, Charleville, Nancy, Rennes, Saint-Dizier, Lyon, Bordeaux and Marseille. These laboratories constitute the physical tools of the Centre Technique and are used in conjunction with the work done at the main offices, Avenue Raphael, Paris.

There, a team of consulting engineers and research workers, each in charge of different specialties, study the problems sent to them by the foundries. They also carry out the research work. A. E. Le Thomas coordinates and supervises all this work. Since its foundation, the Centre Technique has given some 36,000 consultations to foundries. Much of the assistance is given personally by the expert engineers, who have already made about 10,000 visits to foundries all over the country.

In addition to its direct help to the industry and to its research work, the Centre Technique establishes standards and issues certificates ('labels'). It also operates a documentary service, publishes technical literature and, through its engineers, contributes papers to foundry meetings, national and international.

All these services are available to all foundries, who contribute to the financing of the organization by means of a levy of 0.4 per cent of the value of their turnover of castings. The French foundry industry comprises about 2400 foundries of all kind, large and small, which employ some 100,000 workers. The annual output of castings of all kinds is around 1,500,000 metric tons. The value of this production is estimated at between $285 and $325 million a year.

Blast-Cleaning Costs

(*Continued from page* 105)

room and its inlet and outlet vestibules, the conveyor loops and the return strand being outside the room. This design has been changed so that the conveyor line doubles back through the blast room. In this way,

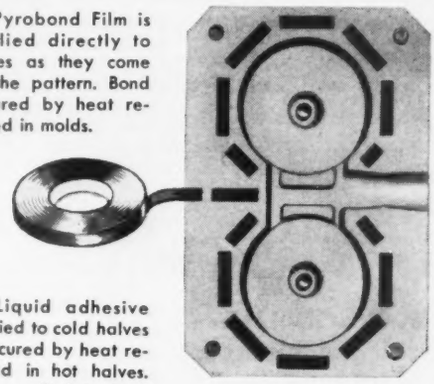
new... for shell molding

PYROBOND adhesive BONDS Shell Mold Halves... gives you these important advantages

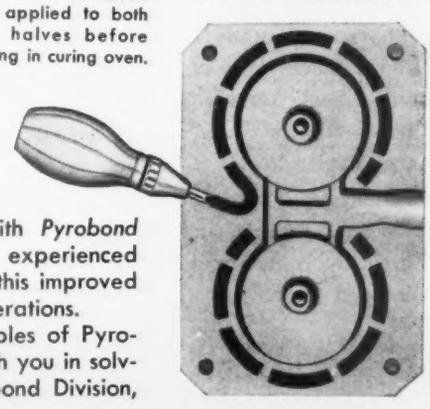
1. Tighter, more uniform closure of mold halves; eliminates need for bolts and clamps.
2. Seals closely and securely around mold cavities.
3. Eliminates need for shot or silica backing in most cases (a critical problem in shell molding).
4. Simplifies reclaiming process; adhesive disintegrates . . . no bolts or clamps to recover.
5. Bonded molds easy to handle and store.

TWO methods of bonding molds with PYROBOND adhesive

1. Pyrobond Film is applied directly to halves as they come off the pattern. Bond is cured by heat retained in molds.



2. Liquid adhesive applied to cold halves and cured by heat retained in hot halves. Also applied to both cold halves before placing in curing oven.



The superior results obtained with *Pyrobond Adhesive* have been proved by experienced shell molders who are now using this improved sealing procedure in their own operations.

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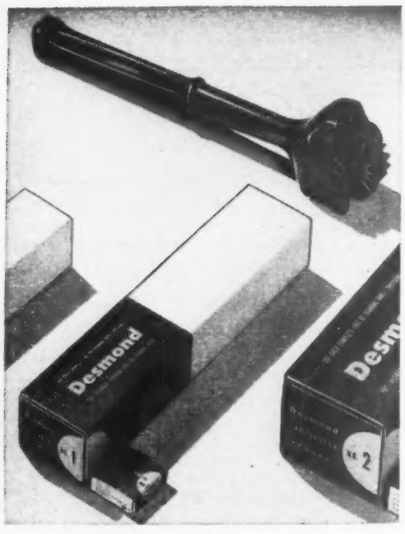

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BETWEEN DRESSINGS— Well dressed wheels stay clean and free cutting longer. You get more work out between dressings. And it takes only a moment to dress any wheel for proper performance.

GET MORE GRINDS

PER WHEEL LIFE— It follows that you'll get maximum service from grinding wheels that are routinely kept in top shape, during the entire life of the wheel. Dressing does not wear wheels . . . it actually prolongs wheel life.

Ask your Desmond distributor for help in selecting the right dressing tools for every wheel in your plant. . .

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URBANA, OHIO

Desmond
DRESSERS AND CUTTERS

abrasive thrown against the front line of castings which misses its mark can strike the returning blocks and be fully utilized. The abrasive wheels, located at different levels along one of the side walls, are arranged so that they can be inspected and serviced from outside the room.

To clean all surfaces of castings hanging on monorails, it is necessary to rotate each casting. All work hooks are fitted with sprockets which engage driving chains so as to rotate every casting at least one revolution per 3 in. of travel through each blast stream. Blast streams strike the castings during the period in which the casting is moving and rotating slowly in front of the abrasive wheels. It is important to efficient cleaning that all surfaces of the castings be exposed to blast streams during the time they are rotating. However, the blast streams are partially wasted during the time castings are indexing to the next position. As a result, a two-speed drive has been developed for monorail conveyors which moves the castings at a very high speed while indexing between blasting positions. The indexing high-speed travel is constant, usually approximating 40 fpm. The slow-speed travel through the effective blast zone is variable, depending on the castings to be cleaned (usually from 2 to 3-1/3 fpm). The distance of the slow speed travel is also variable according to the cleaning requirements of the castings (usually 8 in. for cylinder blocks up to 18 in. for bath tubs).

Minimize Manual Labor

One Detroit installation of monorail conveyor blasting equipment cleans V-8 cylinder blocks. It is a typical example of planned conveying using several types of conveyors and handling a very large tonnage of castings from operation to operation with a minimum of manual labor.

There are three units in the installation, each of which was designed to clean 200 blocks per hour. Actual production has been steady at 240 blocks per hour.

Uncleaned blocks come from shakeout and preliminary rough grinding operations and can be loaded into any one of the three blasting units, as shown in the accompanying illustration. The blocks arrive on a platform conveyor which travels past the loading positions of the three blast units. Hooks on the monorail are spaced 32 in. apart.

Castings arrive at the unloading station and are transferred by quick-acting hoist to an automatic spot blast machine which thoroughly

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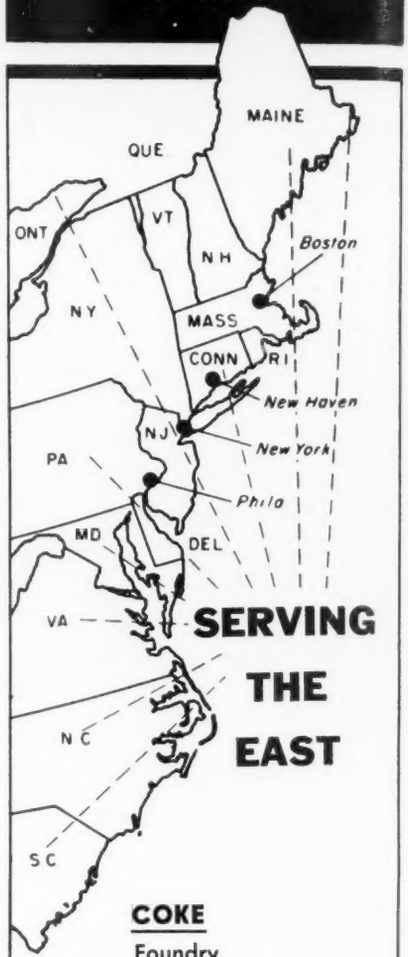

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cleans the inside of the block. This additional step permits freer water circulation in the completed engine. The spot blast machine then automatically deposits castings on vibrating shakers which remove abrasive remaining in the blocks after blasting. Shakers are set up with a turnover station interposed to effectively shake out the blocks.

Within the blast house the abrasive, after striking the blocks, flies in all directions. Because of the wear on all parts subjected to this flying abrasive, it is necessary that all possible mechanism be outside the blast house, and that the conveyor slot be well sealed. This is accomplished by a traveling seal of special ductile iron plates which moves between two 10-in. labyrinth type channels and effectively keeps abrasive within the blast house.

Abrasive handling and cleaning facilities for each of the three blasting units are independent so that any of the installations can be operated independently or shut down according to production requirements.

These machines have the usual abrasive handling system. Abrasive, sand and wires removed from the castings drop through the perforated floor of the cabinet into a hopper. From there it is conveyed by gravity into an elevator which lifts it overhead and deposits it into a separator.

The first part of the separator is a revolving scalping drum which allows abrasive and sand to pass through the openings and discharges wires and large particles from the end of the drum.

Abrasive and sand fall down over stainless steel velocity plates to jump an air gap, at which point sand and broken-down fines are removed. Abrasive which has been freed from sand and wires is deposited into the hopper under the separator for recirculation to the wheels.

This machine is connected to a dust collector to remove dust from the cabinet.

Issues Manual Materials Handling Handbook

A new publication, *Handbook of Manual Materials Handling Equipment*, has been published by the Caster and Floor Truck Manufacturers' Association. It is meant to acquaint industry and laymen with the terminology and fundamentals of casters, wheels, hand and floor trucks, pallets and skids. Copies may be had for $1 from the association offices, 27 East Monroe St., Chicago 3.

Quality Control

(*Continued from page* 95)

hope successful rules and formulas will soon be established to aid in this important phase of making a good casting. The foreman also has the responsibility for sand and facing conditions.

The coreroom foreman should have a record of each job that requires a core. This record should indicate the type of sand to be used, the number and placing of rods or wires and any special instructions concerning venting, handling procedures or anything else pertinent to the making of each core. The coreroom foreman should be responsible for the sand mixes and properties used in the various cores. Specifications should be set up by the head of quality control or, at least, be set up with his knowledge and approval. A record of these specifications should be made, and the coreroom foreman should see that they are adhered to. This same rule concerning specifications also applies to the molding department.

The next consideration is the melt-

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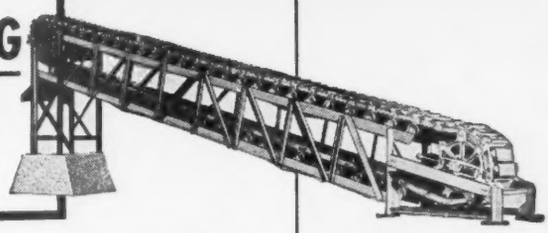

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ing department. The primary duty of the melting foreman is to melt and deliver iron. He must see that the cupola is properly lined, that the proper amounts of the various materials are placed in the cupola, that ladles are lined properly and that required amounts of the various irons are delivered at specified times. He should keep accurate records of time of light-up, the time wind is on, the time and amount of the first and succeeding taps. My plant's method is to have each ladle weighed as it leaves the cupola, but where such facilities are not available, an estimate should be made of the amount of metal delivered in each ladle. Some means of measuring air input and pressure should be incorporated into the air supply, and these figures should be recorded also.

Take Chill Tests

An air-weight control with an automatic recorder and an automatic pressure recorder are two important factors in good cupola control. In addition, chill tests should be taken on each ladle. The foreman need not do this personally, but the responsibility for its being done should rest with him. Temperature readings should be taken with an optical pyrometer at specified intervals (Fig. 9), unless the temperature falls to a danger point, which must be established through experience. Here, the assistance of the quality control man will be needed to help others take more frequent readings and, at the same time, to ferret out and remedy the trouble. Specifications for raw materials should be his responsibility.

After the castings have been poured, it only remains to shake out, clean, inspect and ship them. The cleaning room foreman must watch consistently for poor finish, excessive fins, shifts, strains, signs of shrinkage and other defects which he should take up immediately with the quality control man, who, in turn, should trace them back to the responsible department.

The inspector should watch for nonconformities to pattern and report them to quality control. If he is the quality control man, he should take the trouble back to the responsible foreman. Inspection should be the last step before shipping, and nothing but quality castings should ever reach the shipping platform. Some foundries may sell a finished product or at least be required to perform certain machining operations. The responsibilities of each foreman regarding quality should be outlined, and any deviation from standard should be taken up with the head of quality control.

If each of the foregoing men had no trouble whatever, there wouldn't be much need for a man to head quality control. Unfortunately, these men are going to run into trouble, and quality control will step into the picture when they do. It has already been mentioned that the head of quality control must answer directly to the head of the organization. He must, in the final analysis, have the authority to make and instigate changes in manufacturing procedures. It is important that any change be made as a suggestion so that he can gain the co-operation of the foreman in whose department he is making the change. If diplomacy fails, however, he must have that authority to fall back on.

The quality control man is the filter center for all the records from the various departments. It is his duty to assemble, correlate and analyze the record of each day's operation. He must report each deviation from standard procedure to the responsible person and see that it is corrected. More than that, all customer complaints should be sent to the quality control head for investigation and correction. This procedure is only fair since the quality of the product is his direct responsibilty.

Must Be Well Informed

It has been stated that the duties of quality control and research and development are quite removed from each other and should be separated. I do not think this holds true in smaller foundries. Many are not able to finance extensive research and development and must depend on the reports and articles published by the representative engineers of larger organizations. The quality control man must keep abreast of the times, be thoroughly acquainted with better methods and better products, do a little research and development on his own and be ready to recommend, install and use new products and methods if he feels they will insure better castings.

After the duties of the various foremen have been outlined, the various sand and metal test limits established and records of operation are being kept in good order, the quality control man will develop into a troubleshooter. This means both in the foundry and in the customer's plant. When foundry losses decrease, rejects from the customer follow the same trend, so that more time spent correcting foundry problems means fewer customer complaints, too.

To reduce losses, a foundry must ascertain just how bad its losses are, set a goal at a little lower rate and then as it reaches and holds or betters that mark for a few months, re-

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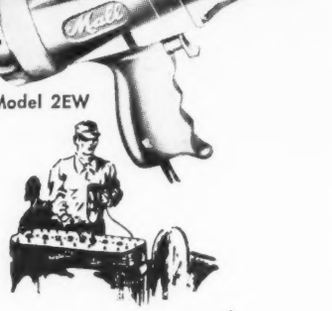

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duce it again. From its scrap records, the foundry should determine which jobs are the highest scrap producers and work on as many of them as it can. Rather than correct a high scrap loss on an order already completed, at a time when it cannot sell the castings, the foundry should have its pattern man tag the pattern so that attention is brought to the difficulty the next time an order is received.

The tag should be dated and should have a record of the casting defects of the previous run. It is also well to compile a record of defects as to causes. In this way, a foundry can tell readily whether time can be spent to greater advantage on sand control, molding practices, pouring, melting or any other phase of the operation which appears to be the leading factor in causing the scrap pile.

The foreman's part in the program includes making the worker quality conscious. This end might be accomplished by incentives for quality work or penalization for poor work. I feel, however, that most workers pride themselves on a good casting and on making a little better showing than the next man. Molders, coremakers and pourers should all be able to see the defectives for which they are responsible.

A quality control program can be just as extensive as a foundry can afford to make it. The organization just outlined will work. How well it will work depends on the amount of time and personnel available and the characteristics of the supervisors themselves.

Ventilation Conference Is Scheduled

The second annual Industrial Ventilation Conference will be held at Michigan State College, E. Lansing, Mich., Feb. 16-19. Co-sponsored by the School of Engineering, Michigan State College, and the Division of Industrial Health, Michigan Department of Health, the conference is devoted to teaching the practical application of exhaust systems for the control of industrial contaminants.

Those attending will have a choice of working out either an elementary or an advanced problem. Both types are worked out in small groups, each aided by an experienced engineer acting as instructor.

There also will be talks and demonstrations by experienced field men on such subjects as duct design, selecting air tempering units and similar matters.

Cement Bonded Sand

(*Concluded from Page* 91)

Molding costs are lower than those obtained with other methods. This is due to fast ramming, and to the fact that large molds can be divided among several men. Strickles and skeleton patterns often are used, particularly where large castings of a jobbing character are concerned.

Contrary to a somewhat frequent statement, sand cement mold production requires a certain amount of skill. Some practice is essential if good molds are to be produced. Riser and other cavities may be filled with ordinary molding sand to provide adequate support during drying. However, skilled molders are not essential, and little training is required.

Sand treatment costs are low. The principal economy factor is labor since molding time in most cases can be reduced by up to 50 per cent. The high dry strength of the mold material effectively reduces distortion, and casting cleaning costs are no higher than normal. The dried sand mixture has extremely high permeability. Lumps of used molds can be used in large cores instead of coke.

It is also possible in certain cases to reduce costs by the application of a reasonably thick cement sand facing and using ordinary silica sand for a backing material. In such cases, some external support is required. Within limits, the dried material does not affect ordinary molding sand should this be inadvertently mixed.

Some variation is observed in the type of sand selected in one foundry and in others, but the following could be regarded as being typical: Southport silica sand, 8 per cent moisture, 8 per cent cement; 150 compression; 125 permeability; 20 lb tensile strength; 20 per cent of each batch is rejected after knockout and new facing mixture substituted. The recovered material has the usual cement and moisture added before use.

Reaches 150th Year

Celebrating its 150th anniversary, Scovill Mfg. Co., Waterbury, Conn., has published a 28-page, illustrated book to commemorate the occasion. Entitled *Brass Roots,* the volume traces as authentically as possible the history of Abel Porter and his brother Levi, who went to Waterbury in 1802 to establish a metal button business, the beginning of what is now Scovill Mfg. Co. Whereas the 1802 plant had 13 employees, counting four partners, Scovill has 7000 in Waterbury alone and 11,000 in all its divisions.

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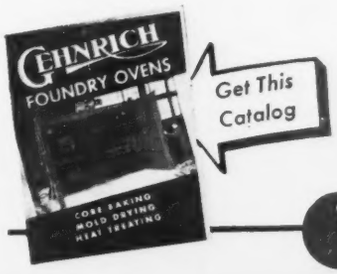

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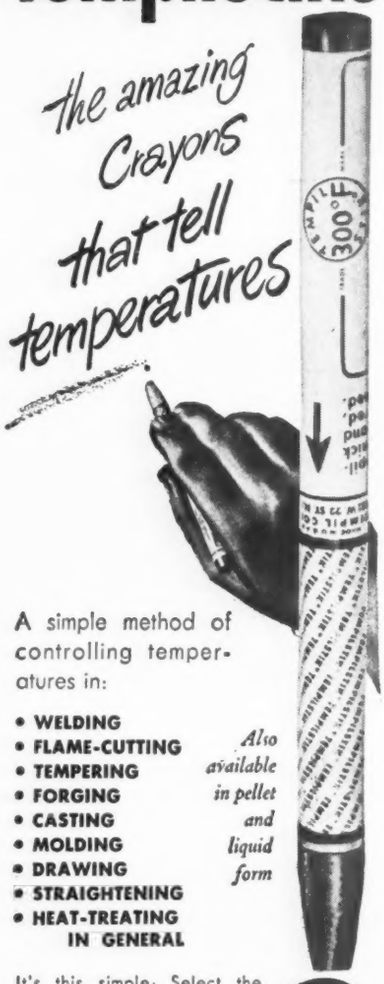

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PLANT LOCATION: Walter Kidde Constructors Inc., 140 Cedar St., New York 6—Brochure is designed to aid company engineers and management in selecting the one location for a new plant that will offer the best combination of factors affecting total production cost. Subjects covered include production materials, marketing, transportation and distribution, labor, supervision, utilities, service and fuels, bank facilities, laws and taxes, community attitude toward industry, living conditions, climate, national defense and site characteristics.

For More Details Circle No. 101—Page 237

SAND RECLAMATION: Denver Equipment Co., Foundry Sand Reclamation Division, P. O. Terminal Box 5268, Denver 17—Bulletin F14-B1 describes the company's sand reclamation system and gives details about small-scale tests conducted at its testing laboratory for prospective users of the system. Simplicity, efficiency and economy of the system are discussed.

For More Details Circle No. 102—Page 237

LIFT TRUCK OPERATION: Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg. — Comprehensive, 24-page manual for use in training lift truck operators combines a two-color cartoon technique with a detailed manual approach. In addition to information about proper operation, the booklet includes material concerning preventive maintenance, safety and basic materials handling.

For More Details Circle No. 103—Page 237

VOLTAGE STABILIZERS: General Electric Co., Schenectady 5, N. Y. —Bulletin GEA-5754 on automatic voltage stabilizers ranging from 15 to 5000 va contains photographs and diagrams of the equipment, explains operation principles and construction and gives complete specifications. It also describes the causes and effects of voltage variations and lists typical applications for stabilizers.

For More Details Circle No. 104—Page 237

BUILDING MAINTENANCE: Stonhard Co., 600 Stonhard Bldg., 1306 Spring Garden St., Philadelphia 23—Manual entitled "Over the Rough Spots" tells how to patch or resurface any type of floor, stop water seepage in underground foundations, repair leaky roofs, preserve concrete or wood surfaces, protect structural steel from rusting and solve other building maintenance problems.

For More Details Circle No. 105—Page 237

UNIT HEATERS: United States Radiator Corp., 300 Buhl Bldg., Detroit 26—Catalog meant to aid anyone who makes calculations and layouts for heating installations covers heater location, various types of unit heater wiring diagrams, steam pipe sizes, capacity data and other information necessary for making a unit heater layout. Each type of unit heater produced by the manufacturer is illustrated.

For More Details Circle No. 106—Page 237

DUST FILTER: Day Co., 817 Third Ave. N. E., Minneapolis 13—Bulletin 528 presents a practical approach to dust control problems and describes the company's dust filter equipment by charts, diagrams, specifications, illustrations and other means. Included is a "Dust Problem Analysis Sheet" which can be filled out and returned to the firm for consideration and recommendations.

For More Details Circle No. 107—Page 237

HEAT-RESISTANT GLOVES: Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh 8—Bulletin describes leather heat-resistant gloves impregnated with insulating and refractory materials for use in foundries, heat treating departments, and similar applications. Certain models described are said to resist heat up to 800° F, others up to 500° F.

For More Details Circle No. 108—Page 237

ELECTRIC FURNACES: Whiting Corp., Harvey, Ill.—Bulletin FO-6, "The Electric Furnace in the Iron Foundry," gives cost data concerning the economy of electric furnace melting. Twelve tables give estimated costs on 8, 16 and 24-hr operation for electrical energy, labor, refractories, maintenance, electrodes, depreciation and interest.

For More Details Circle No. 109—Page 237

GRINDING EQUIPMENT: Hammond Machinery Builders, 1600 Douglas Ave., Kalamazoo, Mich.—Catalog 75 contains 20 large pages of illus-

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trations, specifications, application data and other material about the company's line of backstands, dust collectors and abrasive belt and wheel grinding, polishing and buffing machinery. Each is described in detail as to operation, construction and other pertinent facts.
For More Details Circle No. 110—Page 237

WATER SOFTENERS: Permutit Co., 330 West 42nd St., New York 36—Bulletin 2386 discusses troubles caused by the utilization of hard water and the multiple economies effected by their cure. It lists several industries, including the foundry field, in which steam and water are of importance and explains the usefulness of the firm's water softening equipment to such industries.
For More Details Circle No. 111—Page 237

PERFORATIONS: Erdle Perforating Co., 177 York St., Rochester 11, N. Y. — Catalog illustrating and describing perforations, designed, according to the company, for every known purpose and produced in almost every kind of material, is intended to assist machine and appliance designers, heating and ventilation engineers, builders, architects, manufacturers, maintenance and safety engineers and anyone else using perforations.

For More Details Circle No. 112—Page 237

ELECTRIC HEATING: Edwin L. Wiegand Co., 7300 Thomas Blvd., Pittsburgh 8—Issue 48 of *Chromalox News* describes applications of the organization's electric heating equipment to clean snow and ice from sidewalks, to heat patterns and cure shells on shell molding machines, to provide portable heat sources, to control metal heating and cooling, to facilitate bending of plastic sheets and to do other jobs.
For More Details Circle No. 113—Page 237

CENTRIFUGAL PUMPS: Allis-Chalmers Mfg. Co., General Machinery Division, Milwaukee 1—Bulletin 52C6059J, "Handy Guide to Selection of Centrifugal Pumps," covers general purpose, double suction, multistage, special purpose, marine and mixed and axial flow pumps. It also contains a head-capacity table for the firm's single stage, double suction pumps.
For More Details Circle No. 114—Page 237

GATES AND RISERS: R. Lavin & Sons Inc., 3426 South Kedzie Ave., Chicago 23—Volume 8, Number 3 of *The Lavingot* is devoted to "Gates and Risers," an article by William George, metallurgist and engineer with the firm, laying down the fundamentals for a better understanding of the directional solidification that is required for making sound castings in tin bronzes and red brasses.
For More Details Circle No. 115—Page 237

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INDUSTRIAL TRUCKS: Lewis-Shepard Products Inc., Watertown 72, Mass.—Catalog 34 presents the latest engineering and operating features of the manufacturer's electric-powered industrial trucks. Illustrated with photographs and engineering drawings, the catalog gives full specifications and maintenance features.
For More Details Circle No. 116—Page 237

COMMUNICATIONS SYSTEM: Farmers Engineering and Mfg. Co., Irwin, Pa.—Bulletin 26 describes the company's electronically amplified voice communication system via microphone and loudspeakers. Typical applications, a pictograph of a coordinated application, a typical wiring diagram, components and other points are discussed or illustrated.
For More Details Circle No. 117—Page 237

ALLOY BRIQUETS: Electro Metallurgical Division, Union Carbide & Carbon Corp., Carbide & Carbon Bldg., 30 East 42nd St., New York 17—Booklet of 24 large pages contains complete information about the company's line of alloy briquets for the iron foundry, including their applications, methods of use, specifications and other data.
For More Details Circle No. 118—Page 237

FURNACES: Lindberg Engineering Co., 2450 West Hubbard St., Chicago 12—Bulletin 131 contains photographs, diagrams and specifications charts on all types of gas-fired and electric furnaces produced by the firm. Operation, design features and uses for annealing, normalizing, tempering, nitriding and special heating are explained briefly.
For More Details Circle No. 119—Page 237

PATTERN LETTERS: Canton Products, P. O. Box 981, Canton, O.—Catalog 49 provides 12 pages of information about styles and sizes of type for pattern letters available from the manufacturer. Specifications, illustrations and other material are included.
For More Details Circle No. 120—Page 237

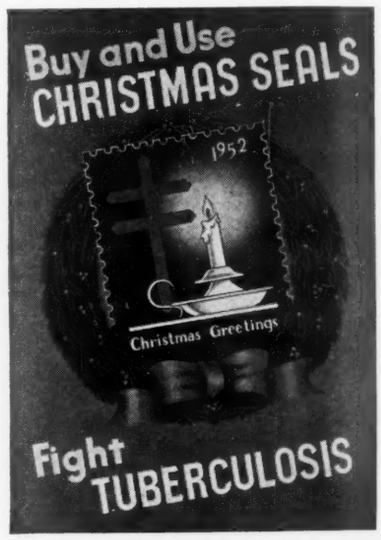
SAFETY SHOES: Safety First Shoe Co., Dept. N46, Holliston 5, Mass.—Catalog with color photographs and cut-away drawings gives complete information about the manufacture's steel-toe safety shoes and other footwear.
For More Details Circle No. 121—Page 237

CORN PRODUCTS: Corn Industries Research Foundation, 3 East 45th St., New York 17—Third edition of "Corn in Industry" explains in nontechnical language the processes by which corn starch, syrup, sugar and such by-products as corn oil and various foodstuffs are made.
For More Details Circle No. 122—Page 237

COMBUSTION SAFEGUARDS: Minneapolis-Honeywell Regulator Co., Brown Instruments Division, Station 213, Wayne & Windrim Aves., Philadelphia 44—Bulletin 9603 contains data on combustion safeguard systems for industrial ovens, furnaces and other heat treating applications fired by multiple oil or gas burners. Bulletin describes system components, lists light-off options available and includes dimensional and operational data.
For More Details Circle No. 123—Page 237

HOSE AND TUBING: American Brass Co., American Metal Hose Branch, Waterbury 20, Conn.—Catalog CC-400 describes seamless and strip wound flexible metal hose and tubing produced by the company. It shows range of available alloys and sizes, suggests applications and furnishes data on hose and fittings. Engineering information is included.
For More Details Circle No. 124—Page 237

GEAR MATERIALS: International Nickel Co., Dept. EZ, New York 5—Bulletin in two parts concerns nickel steel and cast iron gear materials and two new gear materials. Carburizing and direct hardening nickel alloy steels and low and medium silicon nickel gray cast irons are covered. Machinability and the effects of various types of heat treatment are discussed. Characteristics of a precipitation hardening nickel steel are reviewed. Ductile iron is evaluated.
For More Details Circle No. 125—Page 237



FEEDING COMPOUND: Foundry Services Inc., 280 Madison Ave., New York 16—Bulletin concerns the company's moldable exothermic feeding compound for ferrous and nonferrous castings. Material covered includes case histories, instructions as to the use of the product and other points.
For More Details Circle No. 126—Page 237

COMPRESSORS: Worthington Corp., 401 Worthington Ave., Harrison, N. J.—Bulletin L-676-B1 contains an illustrated discussion of heavy-duty package type compressors from 75 to 350 hp. Valves, frame, running gear parts, cylinder, intercooler, control and accessories are covered.
For More Details Circle No. 127—Page 237

WIRE ROPE: A Leschen & Sons Rope Co., 5909 Kennerly Ave., St. Louis 12—"Use and Care of Wire Rope" is a 72-page booklet which contains practical information on proper methods of handling, reeving, breaking in, splicing, cutting, lubricating and specifying wire rope. Over 50 illustrations and 32 diagrams and charts are included.

For More Details Circle No. 128—Page 237

MATERIALS HANDLING: Towmotor Corp., 1226 East 152nd St., Cleveland 10 — Booklet, entitled "How To Catch Man-Hour Thieves," covers five major causes of heavy man-hour losses in manufacturing plants through inefficient handling methods, and four basic plant operations in which such losses are most often sustained. Effective procedures for avoiding such losses in materials handling are suggested in detail.

For More Details Circle No. 129—Page 237

BLAST CLEANING: American Wheelabrator & Equipment Corp., Mishawaka, Ind.—Bulletin 844 explains the process of continuous airless blast cleaning and illustrates how it is being applied in actual practice. This material is of particular interest to shops cleaning relatively large tonnages on a production basis.

For More Details Circle No. 130—Page 237

ROTARY ACTUATORS: Hydromotor Division, Bonnot Co., Canton 2, O.—Bulletin 21 discusses application data and a program covering the range of standard and special models of reciprocating rotary actuators employing air, oil or other proper fluid medium which the firm manufactures.

For More Details Circle No. 131—Page 237

TRUCKS AND CRANES: Baker-Raulang Co., Baker Industrial Truck Division, 1230 West 80th St., Cleveland 2—Catalog 54 is devoted to the manufacturer's line of industrial trucks and cranes. It contains specifications, charts and photos, outlines the step-by-step procedure for choosing fork trucks and covers other points of interest.

For More Details Circle No. 132—Page 237

GAS BURNER: Selas Corp. of America, Philadelphia 34 — Bulletin SC-1009 concerns a tunnel-type multiport gas burner designed to operate on either low or high mixture pressures of any fuel gas and air that can be used in either furnace or open-firing applications.

For More Details Circle No. 133—Page 237

INDUSTRIAL TEMPERATURES: Tempil° Corp., 11 West 25th St., New York 10—Supplementary sheet

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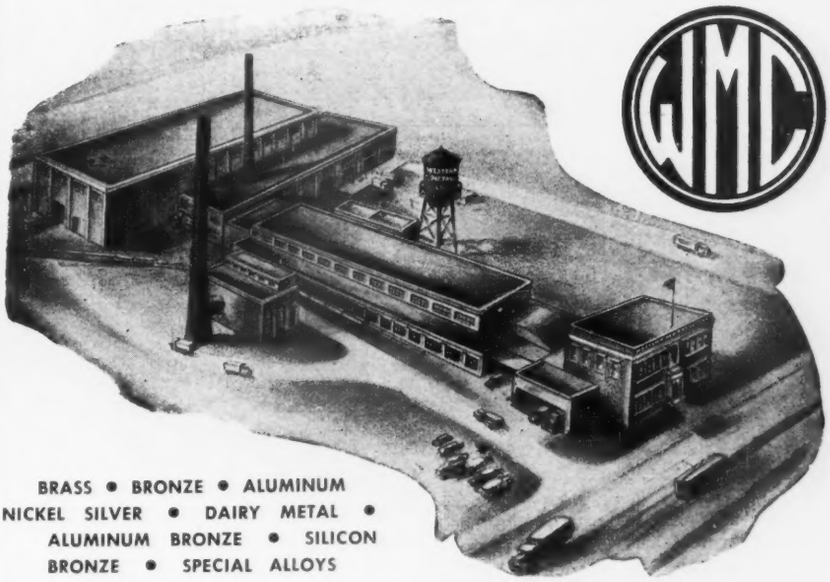

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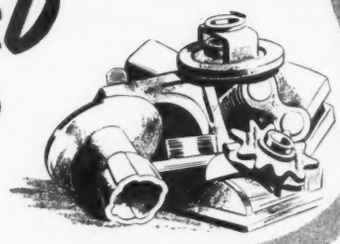

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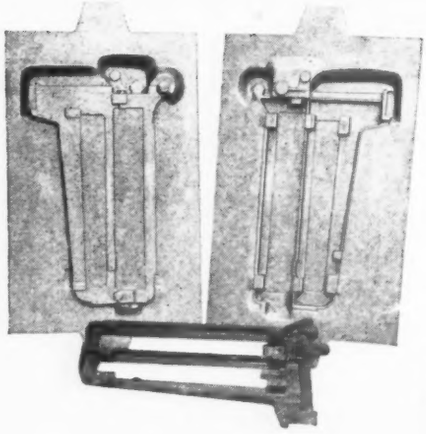

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of instructions contains much valuable information on how the temperature-sensitive liquid manufactured by the company can be employed most effectively to determine attained temperatures of solid metals.
For More Details Circle No. 134—Page 237

SCAFFOLDING: Patent Scaffolding Co. Inc., 38-21 Twelfth St., Long Island City 1, N. Y.—Bulletin ASF-1 describes aluminum rolling scaffold that can be carried, erected and dismantled rapidly and easily. Illustrations and suggestions about uses of the scaffolding are included.
For More Details Circle No. [illegible]—Page 237

INDUSTRIAL [illegible]: J. N. Fauver Co. Inc., 49 West Hancock Ave., Detroit 1—Catalog 52 lists the company's line of industrial hose assemblies, couplings, stems, swivels and accessories. Its 24 illustrated pages give complete specifications.
For More Details Circle No. 136—Page 237

TEMPERATURE RECORDERS: Foxboro Co., Foxboro, Mass.—Bulletin 447 contains details about temperature recorder construction and shows how each component contributes to recorder accuracy. Its 20 pages are designed to assist understanding in the selection and use of temperature measuring instruments. More than 50 illustrations, charts and diagrams are included in describing various installations of the units.

For More Details Circle No. 137—Page 237

GRINDERS: Gardner Machine Co., Beloit, Wis.—Revised edition of 16-page catalog illustrates and describes the complete company line of single spindle disk grinders. Considerable new data is included which should be of interest to persons involved in flat surfacing operations.
For More Details Circle No. 138—Page 237

FLEXIBLE TUBING: Flexible Tubing Corp., Guilford, Conn.—Catalog C2-3 describes the manufacturer's complete line of flexible tubing in diameters from 1 to 30 in. Information is included on fittings and on tubing for special applications.
For More Details Circle No. 139—Page 237

LIQUID POLYMER: Thiokol Corp., 784 North Clinton Ave., Trenton, N. J.—Folder describes the properties of a liquid polymer which converts to a tough, resilient solvent resistant rubber at room temperature. A number of applications are suggested.
For More Details Circle No. 140—Page 237

HOSE CLAMPS: Hose Accessories Co., 2702 N. Seventeenth St., Philadelphia 32—Bulletin 125 contains complete information on all types and sizes of hose clamps produced by the company and on their capacities and applications.
For More Details Circle No. 141—Page 237

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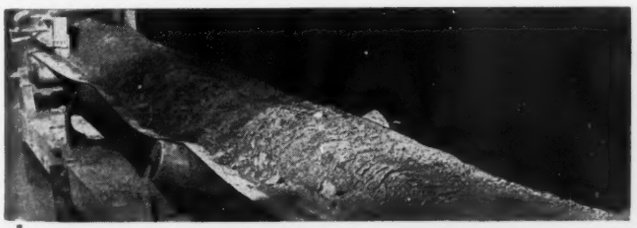

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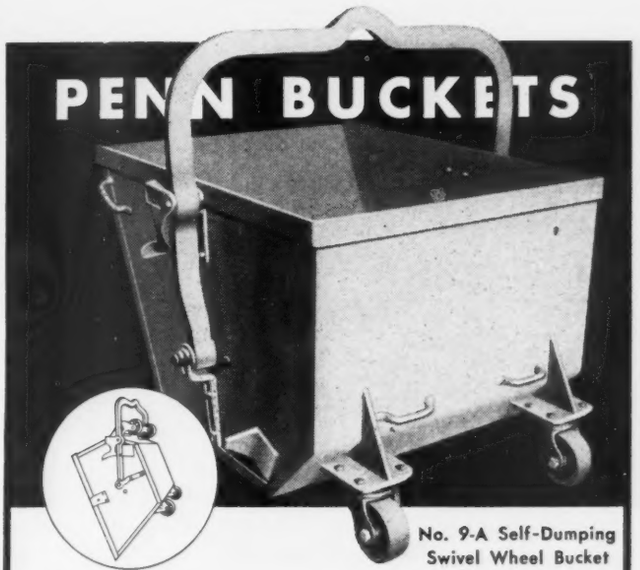

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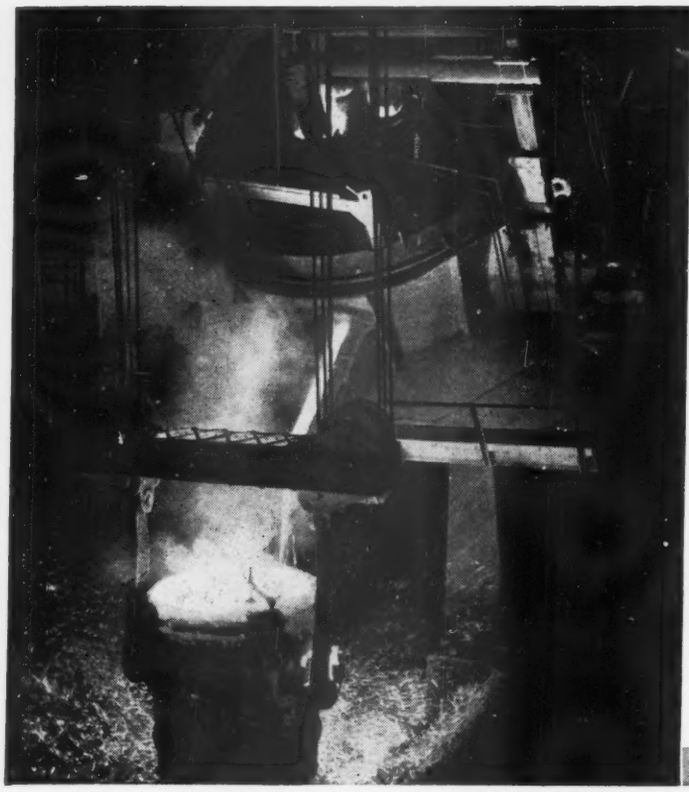

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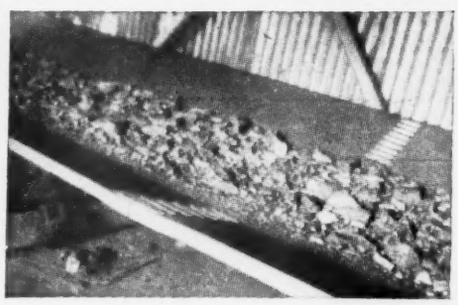

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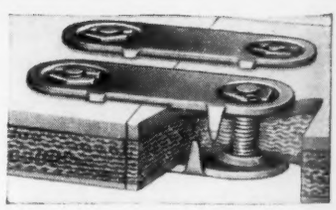

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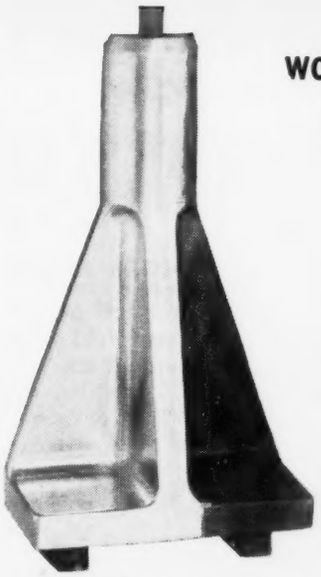

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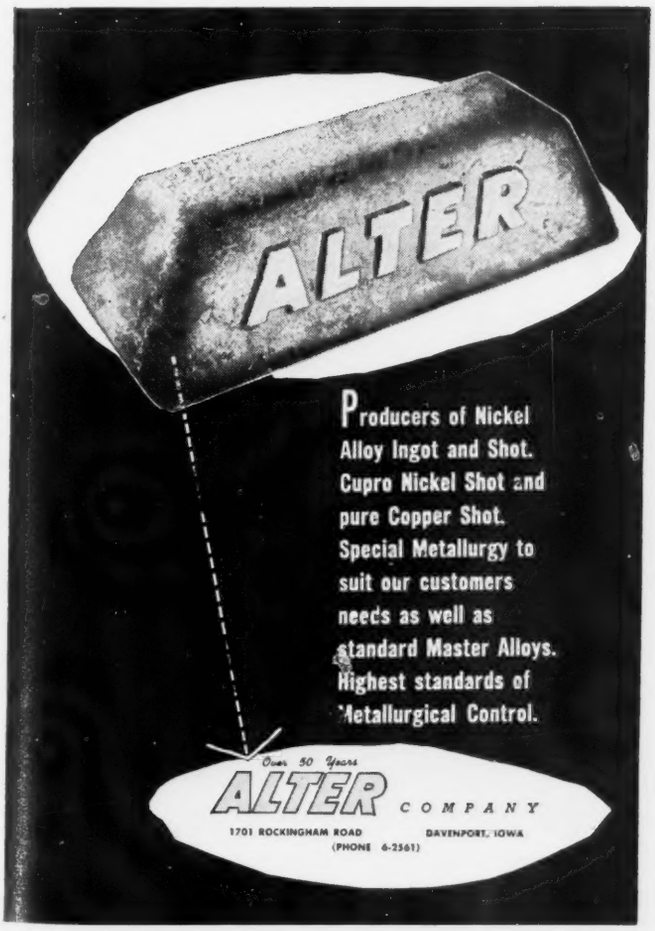
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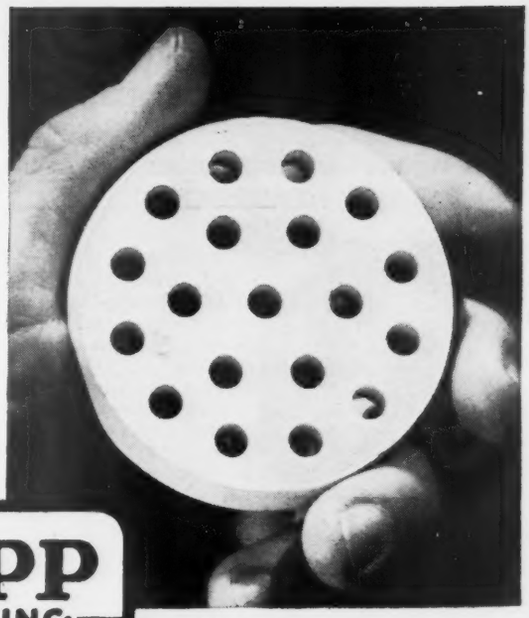

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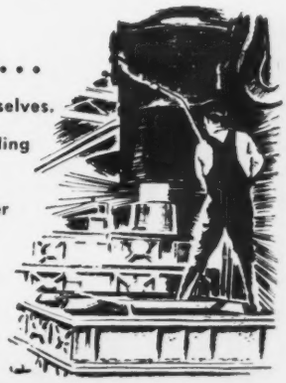

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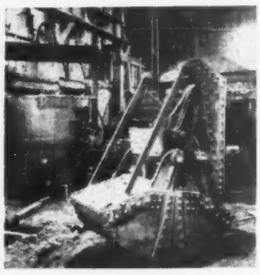

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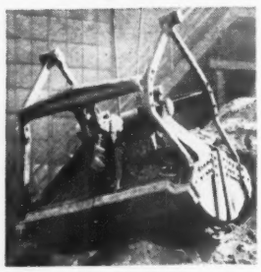

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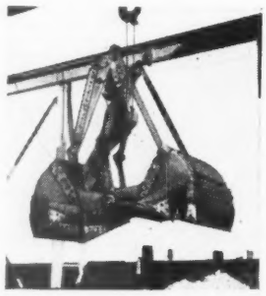

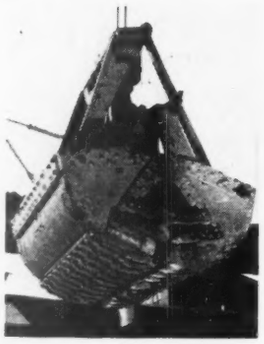

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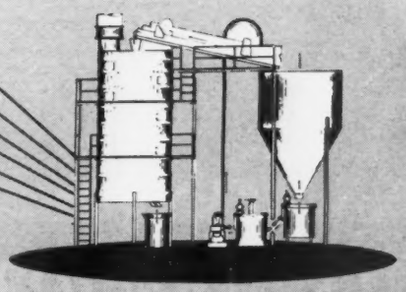

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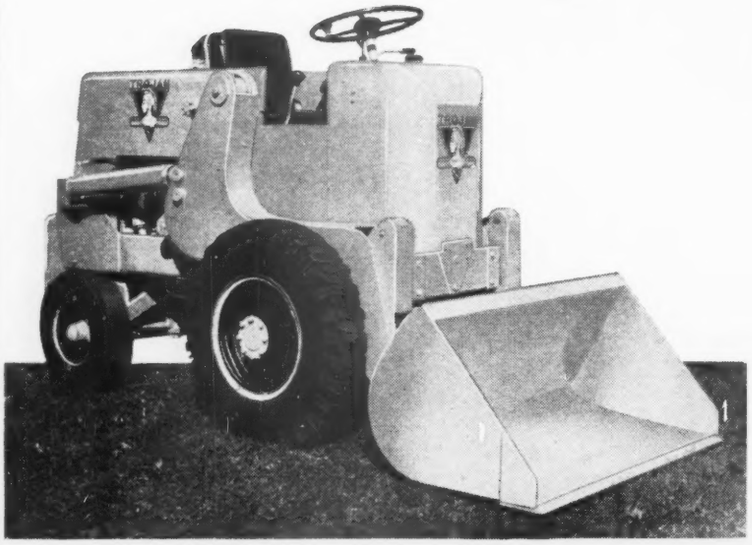

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Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

A "blend" with JISCO is sound metallurgy.

HIGH SILICON IRON JISCO

THE JACKSON IRON & STEEL Company
JACKSON, OHIO

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SOLVE THEM BY USING

WATERLOX
TRANSPARENT
CASTING SEALER

Successfully Impregnates Castings Of All Sizes
WRITE FOR COMPLETE DETAILS

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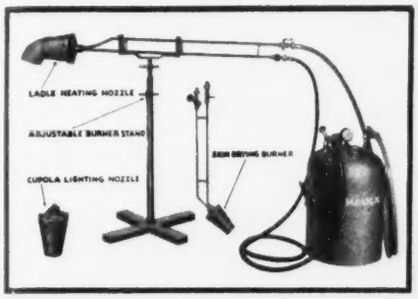
1 OUTFIT DOES ALL 3

Dries Molds
Heats Ladles
Lights Cupolas



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All-Purpose
OIL
BURNER
EQUIPMENT
Simple
Speedy
Economical

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The many heating jobs this Hauck Foundry Outfit performs is positively amazing! Interchangeable nozzles make the equipment equal to 3 separate burners. Burns fuel oil or kerosene, with compressed air. No preheating; no carbon. Flame size instantly adjustable. Eliminates smoke, noxious gases, ashes.

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Oil and Gas Burners for Core Ovens, Annealing Furnaces, Heating and Drying
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PIONEERS IN ENGINEERING, MANUFACTURING & INSTALLING OF

"Uni-Wash"
DUST COLLECTORS
Recirculating Water Type —Compact—Efficient—Proven by Foundry Users

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More Air Circulation— Faster Bake and Better Cores

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FAST! ECONOMICAL!

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Walnut in shape and size, Soda Briquettes expose maximum surface area for fast, efficient, dependable performance.

They are simple to feed into ladle or cupola, save time and cut labor costs. Soda Briquettes are dustless, which eliminates waste and improves working conditions.

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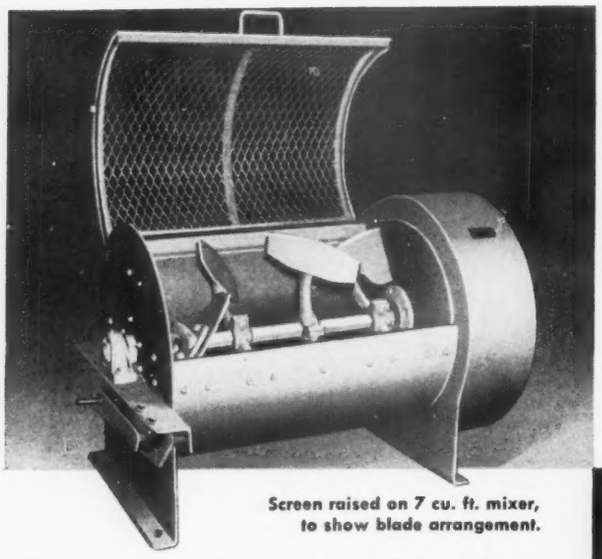


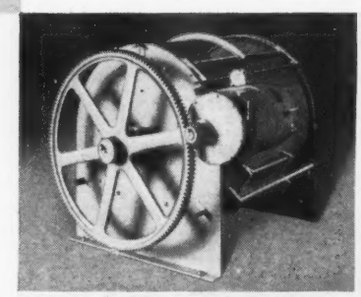
Screen raised on 7 cu. ft. mixer, to show blade arrangement.

For a fast 4-minute mix—

MULTI-MIXER

- With multi-blades for perfect mixing
- Direct drive motor, no clutch or belts
- Wear resistant liners and paddles

Get a fast 4-minute mix and ½-minute discharge for your core and molding sands, and cupola patch mixes. Get a perfect mix too, with the best blade arrangement in any mixer—it cuts, turns, and kneads ten times with each shaft revolution. These trouble-free Multi-Mixers come in capacities from 3 to 60 cubic feet. Larger and special mixers made to our specifications. See your foundry equipment dealer or write us direct.



Rear view of 7 cu. ft. mixer, with gear guard removed, showing direct drive motor. Anti-friction bearings throughout. Quick acting discharge door is operated from the front of the mixer. Mixers are shipped complete, ready to install and operate.

MULTIPLEX MACHINERY CORP. ELMORE OHIO

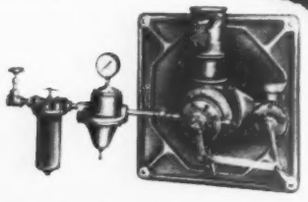
YOU ALWAYS GET

PRECISE CONTROL of Temperature and Combustion Quality in

- ANNEALING FURNACES
- CORE OVENS
- AIR HEATERS
- REVERBERATORY MELTING FURNACES

with **HAUCK BURNERS**

Proportioning Oil Burner for manual or automatic operation—Catalog No. 410.



Combination Oil and Gas Proportioning Burner for instant switching of fuel and equally good combustion on either fuel—Catalog No. 408A.

By the movement of a single control lever, both the air and fuel supplies are simultaneously regulated and accurately proportioned in each burner. The air-fuel ratio is consistently accurate over the entire range of capacity.

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Oil and Gas Burners for Core Ovens, Annealing Furnaces, Heating and Drying
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AN EXCELLENT BRASS FLUX
—Economical—
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FOUNDRY

THINGS ARE HAPPENING IN THE FOUNDRY INDUSTRY

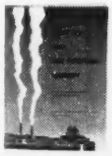
In one of the most extensive studies* ever undertaken in the foundry industry, foundrymen told what publications *they read* and what publications they find *most useful*. FOUNDRY received this overwhelming "vote of confidence".

*We will be happy to show you this complete report. Just drop us a line or ask the man from FOUNDRY.

	FOUNDRY	Publication A	Publication B	Publication C
Readers	596	270	332	205
"Most useful publication"	303	51	35	16

To the question, "Which publication do you find most useful?", FOUNDRY received nearly *six times* as many votes as the next publication, and *twice* as many votes as *all other publications combined!*

To get your product story over to the dynamic foundry market, *tell it in FOUNDRY*. It will reach over 45,000 foundrymen who influence buying in the foundries which account for 94% of all castings production.



Do You Have This Marketing Guide?

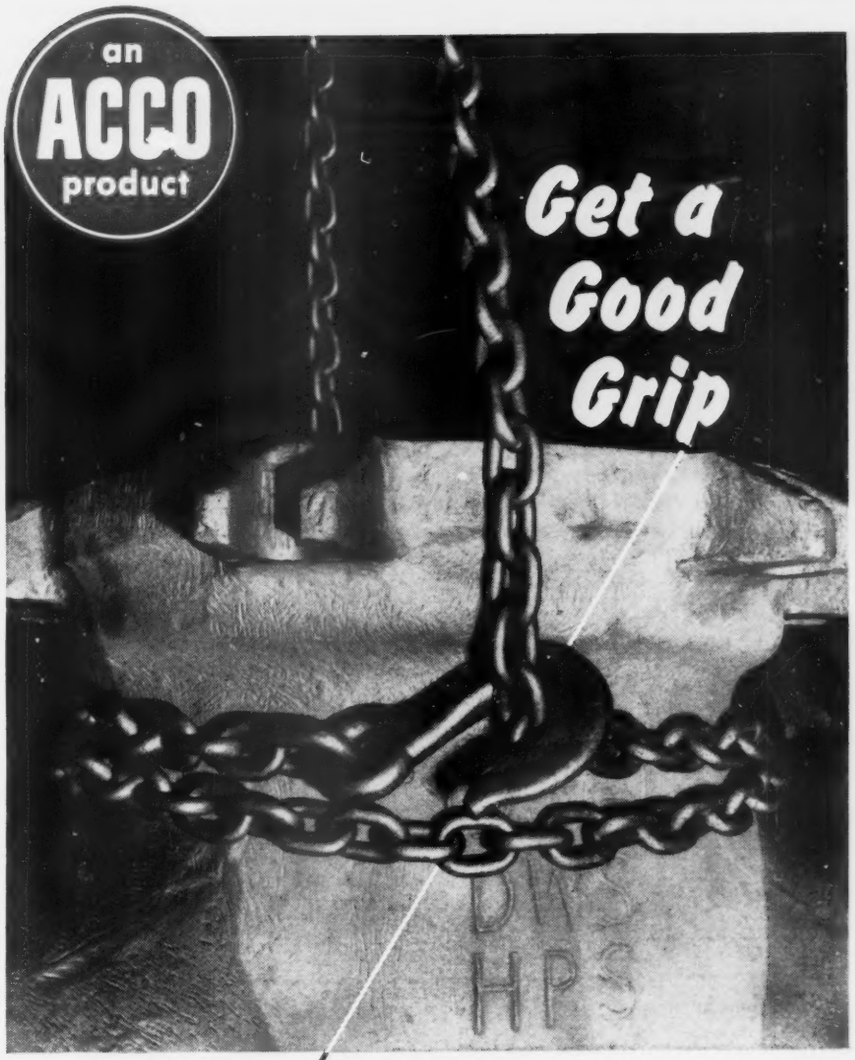
"How To Sell The Foundry Market" is free. Write us or ask your FOUNDRY representative and a copy will be mailed to you.

NBP

CCA

FOUNDRY

A Penton Publication
Penton Building
Cleveland 13, Ohio



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Your American Chain distributor will give you facts and specifications on ACCO *Registered* Sling Chains. Call him today or write us for **DH-314** ACCO *Registered* Sling Chain Catalog.

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MAHR CRUCIBLE MELTING FURNACES

For Melting Non-Ferrous Metals

13 TILTING AND NON-TILTING MODELS
GAS OR OIL FIRED

MAHR Crucible Furnaces are designed so that low pressure air passing from the blower through the trunnion and then through the preheat chamber is delivered to the burner at the correct temperature, assuring shorter heatup time and lower fuel consumption.

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WRITE for Equipment Bulletin No. 50-A for complete specifications.

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Standard • Batch • Pusher • Continuous
Rotary • Pit • Gas Or Oil Fired

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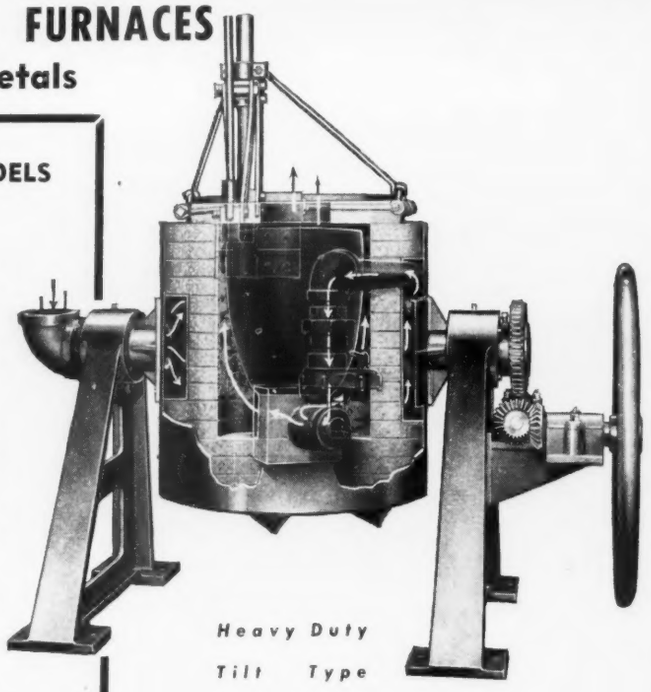
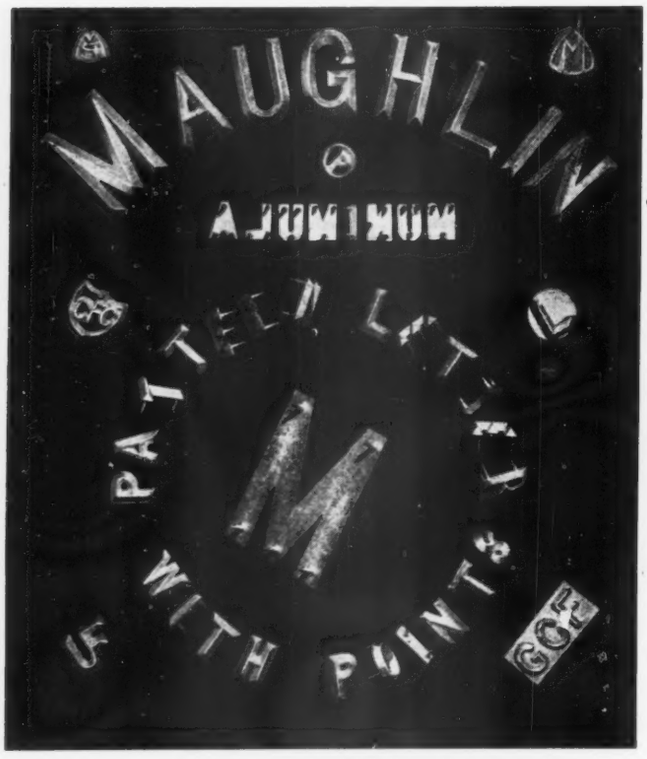


Heavy Duty Tilt Type Melting Furnace

MAHR MANUFACTURING CO.
DIVISION OF DIAMOND IRON WORKS, INC.
MINNEAPOLIS, MINNESOTA, U.S.A.

A Hammer Blow Secures Letters To Pattern



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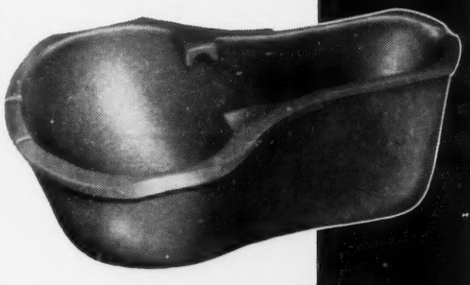

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INGOT MOLDS

... FOR MELTING NONFERROUS METALS

MADE OF SPECIAL M-HEAT RESISTING IRON

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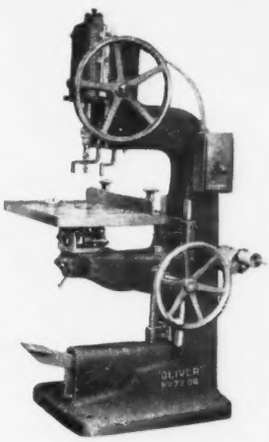
No. 72-DR Motor-in-Head

ROUTER-BORER

An accurate, sturdy machine for patternmakers

- For rapid, accurate boring, milling or routing, light shaping, and recessing of small core boxes and patterns, this "Oliver" is a valuable time-saver.
- In one stroke it bores a hole up to 2" diameter, up to 6" deep, in the center of 36" stock.
- Table measures 20" x 24" and has 12" vertical adjustment. It swivels completely around. Tilts 45° in any direction.
- This machine is also offered as a Borer only.



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OLIVER MACHINERY COMPANY

GRAND RAPIDS 2, MICH.

Master Power

HARD CHROMED • PORTABLE PNEUMATIC TOOLS

DO MORE WORK AT LESS COST

because they deliver more power per cubic foot of air consumed, are light in weight for easier maneuverability and they retain their new tool power longer.

ARE PREFERRED BY OPERATORS

because they are lighter in weight, better balanced and designed to reduce shock and be free from vibration.

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FOR SAND SLINGERS, CONDITIONERS AND CONVEYORS . .

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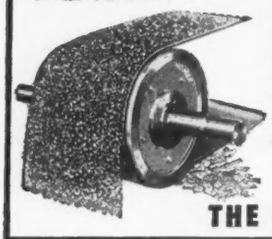
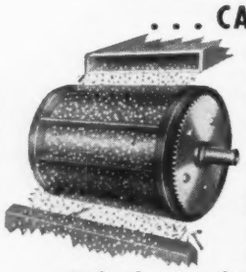
Permanent non-electric—Unaffected by Heat, Cold, Moisture

. . . CAN BE USED INSIDE or OUTSIDE PLANT . . .



Homer MAGNETIC PULLEYS and UNITS —Available in standard diameters from 12" to 30"; belt widths 4" to 60". Special sizes upon order.



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Homer MAGNETIC PLATES—Available in standard widths from 4" to 26"; lengths and number of poles as required. Special fabrications to your specifications.

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When you true up surface blemishes in iron and steel castings with Smooth-On No. 4 Foundry Cement, you can make a close match in color and texture. For light colored, fine grained castings use Smooth-On No. 4AA, which will also take a machined finish. For medium gray metal choose No. 4A. For dark gray, coarser grained pieces you'll find Smooth-On No. 4B a match. Experienced foundry men use Smooth-On Foundry Cements regularly to fill in harmless but disfiguring sand and blow holes, pock-marks, porous spots and small dents. If your supply house hasn't Smooth-On No. 4 Foundry Cements, write us.

FREE Sample and Handbook

Write for free trial sample—specifying shade you wish to try. We'll send also the famous 40-page Smooth-On Handbook of time-saving, money-saving repairs made with various Smooth-On Iron Cements. Send NOW.

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The Wellman "Hook-on", single-line bucket is designed to provide clamshell bucket service at any crane hook where suitable head room and hoist capacity are available.

Hook the yoke over the crane hook and the bucket is ready for work. When the job is finished, take the yoke off the hook and the crane is free for other duties.

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ALLOY METAL ABRASIVE CO.
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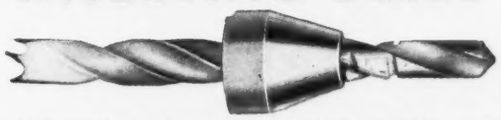
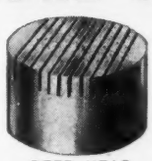
SERVING YOU
in
"Core Blowing Operations"
INSERTING DRILL



- Uniformity of holes
- Faster insertion of vent
- Correct Depth

CORE BOX VENTS



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Wide or Narrow Slots
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For Cleaning Slots
Made of Tempered Steel, Easy to Use

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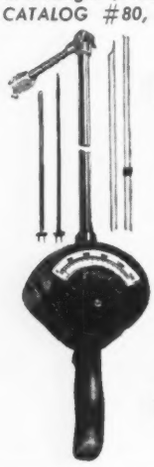
Use the Simplified PYRO Optical Pyrometer

Any operator can quickly determine temperatures of minute spots, fast-moving objects and smallest streams with the simplified PYRO Optical Pyrometer. Completely self-contained—no calibration charts or accessories needed. An accurate, DIRECT-READING instrument that will pay for itself many times over by helping prevent spoilage. Weighs just 3 lbs. Available in 5 ranges (1400° to 7500° F.) *Write for FREE CATALOG #80, today!*



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Helps insure low-cost production of SOUND, UNIFORM Castings. Has shielded steel housing which is shock-proof, dust-proof and moisture-proof—withstands roughest handling. "Protected Type" and "Bare Metal" thermocouples are instantly interchangeable, without adjustment or recalibration. Large 4-inch easy-reading dial. Equipped with exclusive LOCK SWIVEL. Available in 6 ranges (1000°F to 2500°F). *Write for FREE Catalog #150*

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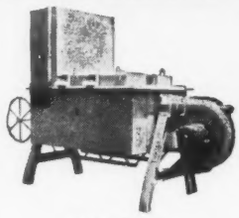
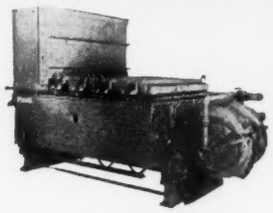


400 Series



1000 Series

Reda Stack-Loading melting furnaces for ferrous and non-ferrous metals have been designed and built by experienced foundrymen for foundrymen everywhere. That is why Reda furnaces provide advantages far beyond those found in other, and more expensive types; that is why, with Reda furnaces there is less down time for maintenance, longer, uninterrupted melting runs, and lower melting costs.

Another feature is the Reda Burner arrangement which can operate from oil and gas simultaneously or be switched from one fuel to the other instantly.

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	CHARGE		MELT CAP./HR.	
SERIES	IRON	BRONZE	IRON	BRONZE
400	400#	450#	800#	1350#
550	550#	625#	1100#	1875#
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LARGER MODELS ON REQUEST

STACK LOADING
DIRECT FIRED—REFLECTING TYPE

REDA FURNACE

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INDUSTRIAL COKE

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Join the long list of foundries who swear by the advantages of CO-LOIDAL-AC. Send in a trial order today. Available in gallons or drums, clear or colors.

WRITE FOR COMPLETE INFORMATION

AMERICAN LACQUER SOLVENTS CO.
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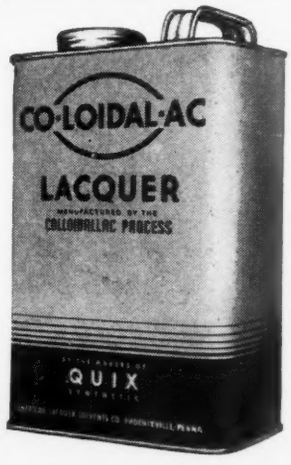
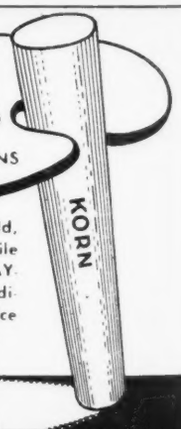


Mark it with KORN

METAL MARKING CRAYONS



Permanent markings on all types of hot, cold, wet or dry metals assured with these versatile crayons. Ideal for marking cores. KORN CRAYONS produce superior results under all conditions. Write today for *free samples* and price list. Inquiries from distributors are invited

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415 N. ST. CHARLES HOUSTON, TEXAS

FOR SALE

Continuous molding system consisting of: Link-Belt Company sand system complete with 11 molders stations, sand bins and gates. Simplicity Shake-Out Machine. Richards-Wilcox overhead mold conveyor with mold pallets. Pouring escalator. Used two months. Whiting No. 2½ Cupola with ship charger, blower, Foxboro air weight control and motor. All in A-1 condition. Address: Box 407, FOUNDRY, Cleveland 13, Ohio

For Sale

USED FOUNDRY EQUIPMENT
EXCELLENT CONDITION

1—4000# (Approx.) Geared Ladle—Price $75.00
1—No. I Demmler Core Blower (practically new) Price—$450.00
1—Stuebner Scoop Type Charging Bucket—Price $50.00
6—Campbell - Hausfeld Stationary Aluminum Furnaces, 300# Capacity—Price $50.00 each
1—Lot Iron Melting Pots for above furnace—new—Price $15.00 each
25—12 x 24 Johns-Manville Core Plates—new—Price $1.00 each
25—17 x 30 Johns-Manville Core Plates—new—Price $2.00 each
3—Adams Aluminum Pop-off Flasks—Good condition 5" cope, 4" drag—Price $35.00 each
1—Globe Tumbling Barrel with motor—Bargain—Price $150.00

BOX 432
FOUNDRY CLEVELAND 13, OHIO

FOR SALE
SAND BLAST EQUIPMENT

Wheelabrators-Tumblast size 48 x 42
Wheelabrator size 48 x 48. Like new. $6000.00.
Wheelabrator 27 x 36 Tumblast good condition—rubber belt. $3000.00.
Pangborn ES-207 Blast Cleaning Cabinet used for Strip steel or bar stock. $1750.00.
Pangborn 8 ft. table. Like new. $4000.00.
Sand Blast Cabinets, pressure tanks, dust collectors and blowers. All sizes.
Contact us for your sandblasting needs or any surplus sandblasting parts and equipment you have for sale.
Will accept your small machines as trade in on any of the above equipment.

DIAMOND SALES INC.
5654 WEST JEFFERSON
DETROIT 9, MICHIGAN

FOR SALE
HOUGH PAYLOADER—MODEL HA

#918 Johnston & Jennings Molding Machine Jolt Rollover and Pattern Draw—Table 44 x 54
(2) RES International jolt, squeeze, rollover, and draw molding machines; 800 lb. capacity
5000 lb. Automatic Fork Lift Truck, electric, with Edison battery
6000 lb. Clark Ford Lift Truck, gasoline

BALCHER MACHINERY COMPANY
1884 S. COMPTON ROAD
CLEVELAND HTS. 18, OHIO
TELEPHONE: FAIRMONT 1-1186

EQUIPMENT FOR SALE

2—Osborn #601 jolt rollover pattern draw machines.
1—Milwaukee #60-B jolt rollover pattern draw machine.
1—American Wheelabrator tumblast 27 x 36 without skip hoist.
1—American Wheelabrator tumblast 36 x 42 with skip hoist.
1—American AM sandcutter.
1—American A.A. sandcutter gasoline driven.
2—U.S. Johnston & Jennings #2 jolt squeeze pinlift machines.
2—Tabor portable jolt squeeze pin lift machines.

All the above equipment is in good condition and priced to sell.

MARCH BROWNBACK CO., INC.
POTTSTOWN, PA.

FOR SALE

$350.00 takes complete lot. 6 metal slip flasks, 3 hinge flasks, crucibles, coke fired furnace (melting), 1 ton Albany sand, 1 new pyrometer, 1 larger blower. Other miscellaneous items. Address: **EUGENE DENISON, 1622 GLEN PARK DRIVE, CHAMPAIGN, ILLINOIS.**

FOR SALE

1 210# Melting furnace will accommodate #70 Crucible. Just relined, no burners but adaptable for either oil or gas.
24 12 X 18 magnesium flasks with 4" cope and 3" drag. Fremont slip type with sand strip.
1 Dietert Permability Meter, rebuilt.
1 Tumbling machine with motor ¼ sack capacity.

BARNES MANUFACTURING CO.
MANSFIELD, OHIO

COMPLETE FOUNDRY

TO BE DISMANTLED

(CAN BE SEEN IN OPERATION)

TO BE SOLD PIECEMEAL — PRICED RIGHT

Most Machines 1947 Mfg.

SAND HANDLING EQUIPMENT

Sand Conveyor, 22" Belt, 115" c to c, with Aerator
Unit A Syntron Feeder Hopper, 6' x 6'
24" Magnetic Belt, 56' c to c
Feeder Sand Belt, 20" wide 14'6"
Rotary Screen Tumbler Barrel, 5' dia. x 12' lg.
Elevator #1, 14" x 8" Buckets
2 Aerator, Overshot type, 9' x 2' & 4' x3' Distribution Belt to Aerator 24"
2—36" Apron Feeder, 12'6" c to c
#3 Simpson Mixer, Style E, 8' dia. crib, #49336—1947
#3 Simpson Mixer, Style E, #33147—1945
Belt Conveyor under Sand Mill, 24" wide 25' c to c
Elevator #2, 8" x 16" Buckets 40' c to c
Distribution Belt 24"
Aetna Sperser System
Bartlett & Snow Waste Sand Handling System
- Apron Conveyor
- Magnetic Belt Conveyor
- Bucket Elevator
- Storage Bin

Simplicity Shaker, model C
Steel Bins
- 1—6' x 7' x 3'6"
- 1—12' x 7' x 3'6"
- 5—4'6" x 4'6" x 1'

150 ton Storage Bin
Exhaust System
- Piping
- 100 hp Motor
- American Blower
- Sludge Tank
- Oil Froth Wet Dust Collector

MOLDING EQUIPMENT

Herman Jolt Roll Over #6000, 40" x 60", 1947
2—Herman Jolt Stripper, 48" x 54", 1947
Osborn Jolt Roll Over, model 405, with Roll Out Car
Osborn Jolt Roll Over, model 405S, with Roll Out Car 44" x 48"
Champion Stripper, 36" x 48" x 8", 1947
5—Osborn Portable Squeezers 275J
Osborn Portable Squeezer 276J
2—Int'l Portable Jolt Squeezer Power Pin Lift, PKL 12, 1947
3—Int'l Portable Jolt Squeez Pin Lift, PKL 14, 1947
2—Osborn Portable Stripper, 712J, Pin Lift
2—Int'l Roll Over, model G, 30 x 8, 1948
2—Int'l model J Hand Rollover Power Jolt Foot Draw Molding Machines 6 x 20

MOLD HANDLING & SHAKEOUT EQUIPMENT

Stoney Double Jolt Knock Out
Simplicity 4 x 7 Shakeout, model B
Productive Shakeout 6 x 8
500 ft. Cleveland Tramrail
900 ft. 10" Logan Roller Conveyor 3½" dia.
Jeffrey Powered Wood Slat Conveyor

CRANES & HOISTS

Budgit Top Running Bridge Crane #46, 15' span
15—Curtis Traveling Bridge 15' span
4—I-R size D 4000# Air Hoist
16—Curtis Air Hoist, 5 x 6" Cylinders, 3½' x 4' Lifts
3—Keller 300# cap. Air Hoist, size S6-IV3

CUPOLA & LADLE EQUIPMENT

Roots Connersville Blower, 20 x 60, 75 hp
Roots Connersville Blower, 22 x 66, 75 hp
Roots Connersville Blower, 12 x 30, 20 hp
Blystone Mixer
5—Modern Cylindrical 2000# cap. Ladles, Hand Gear Trolley Type
Modern Tub Ladle, Trolley Type, 2000# cap.
Modern Tub Ladle, Trolley Type, 300# cap.
Modern Mixing Ladle, 36" x 54", Hand Gear, 3 ton cap.

CORE DEPARTMENT

3—Young Bros. Core Drying Oven 12' x 12' x 8'
Young Bros. Conveyor Type Core Oven 7' x 5' x 12'
Simpson Sand Mixer, model C, 6' dia. x 2'6" deep

MISC. FOUNDRY EQPT.

B & P Screenarator
Dayton Pneumatic Floor Ram
5—Master Size 2F Floor Rammers
American Sand Cutter, Model AA

SAND TESTING EQUIPMENT

Combs Gyrator Sifter
Compression Test Machine
Specimen Rammer
Permeability Tester
Analytical Balances
Drying Oven for Moisture Test
Moisture Drying Machine

IN ADDITION

3000 ft. Webb Overhead Trolley Conveyor #458
Baker Lift Truck, 6000# cap., 1948
Pangborn Rotoblast, 14' cap. with 5 five ft. tables
Logan Wood Slat Conveyor, motorized, 36" Roller Conveyor
Thor Tool Balancers
Hand Grinders
Diamond Co. Face Grinder 36 x 86 x 36, 1942
Diamond Co. Heavy Duty Horizontal Grinder, 30" wheel
Hammond Double End Snag Grinder
7—18" Pedestal Grinders
Tons of Flasks
Core Blower, Champion, model CB 400, 1943
Gogan Brinell Testing Machine, Stationary, Floor Type model 2133, table 27½" x 24" x 7" high
Spencer Turbo Blowers, 2250 cfm at 16 oz—2850 at 16 oz
Roto-Clone units, 24W & 36W, with sludge ejectors
Vibrators, Osborn, 1⅝" & 2"
Welded Steel Pouring Crucibles, new, 1700#
Bottom Dump, Sand Buggies
Exhaust Fans—to 60"
Motors—TEFC & TEFCXP
Fire Extinguishers—CO2
Exhaust Blowers—all sizes

ALLIED MATERIALS HANDLING COMPANY

4657 Spring Grove **Cincinnati 32, Ohio**

For Sale

FOR SALE

MOLDING MACHINES

8—13 x 8 Tabor power squeeze flask lift machine split pattern type.
2—Deuscher Stationary jolt squeeze.
2—SPO #611B Stationary Oscillating Jolt Squeeze Strippers.
4—#610 Johnston & Jennings Air Jolt Rollover Draw Portable 24 x 30 table.
1—Tabor 36 x 50 table Air Jolt Rollover Draw, 3000# capacity.
1—International G 24 x 10 air jolt and rollover, foot draw, portable.
2—International PKL 14"-5½" Jolt Squeeze Pin Lift.
3—Tabor Pedestal Core Rollover Hand Ram Rollover Draw 14 x 20 table 8" draw.

BLOWERS FOR CUPOLAS AND FURNACES

2—15 HP Spencer-Turbine 2250 CFM at 16 oz.
10—High temperature blowers 1400° F. 9000 to 15000 C.F.M.
2—#7½ Roots rotary blowers—27 x 81—14000 CFM.
1—Connersville rotary blower 22 x 66 45 cu. ft. per revolution 9000 CFM.
Maxon-Premix Blowers for Gas ¼ to 1 HP.
2—5 HP 20-oz. Spencer Turbine Blowers.
2—2 HP 20-oz. Spencer Turbine Blowers.
2—#7½ Rotary Blowers 27 x 81, 14000 CFM.

METAL MELTING EQUIPMENT

2—1000# open flame brass melting furnaces, gas fired.
1—Hausfeld Stationary Brass, Multiple gas burner, 200# cap.
1—Hausfeld Tilting crucible, gas, 250# Al Cap.
1—Hausfeld 2000# aluminum capacity furnace, barrel type, open flame, oil fired.
New 32" to 41" dia. shell cupolas made to order.

MISCELLANEOUS

1—Stoney crane type shakeout.
1—Dings type M magnetic separator.
1—NC-4 sand separator.
1—#1 Demmler core blower.
2—#16 Roto-clone units complete.
25 Tons steel flasks in sizes from 26 x 26 to 60 x 60.
1—McLeod Small Sand Blast Barrel 24 x 24.
1—36W Wet Type Roto-Clone 34000 CFM.
1—24W Wet Type Roto-Clone 13000 CFM.
Complete stock of rebuilt mill and dust exhaust blowers.

CLIFTON MACHINERY COMPANY
1023 W. SIXTH ST. CINCINNATI 3, OHIO

FOR SALE

Spencer multi-state turbo compressor, catalog #1220, 2300 C.F.M. at 20 ounces per square inch pressure. Complete with Spencer outlet adjusting valve. Motor 20 H.P., 1750 R.P.M. 3 phase, 60 cycle, 220/440 volts. Serial #39470. A-1 condition. Address: Box 433, FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Screenarator, Beardsley & Piper, Model M, Motor 3 HP 220-V, 3 phase, 60 cycle and all necessary controls. Preparator, Beardsley & Piper, complete with Dings Magnetic Separator, all necessary electric motors, starters and other electrical equipment. Address: **WISCONSIN GREY IRON FOUNDRY CO., 2569 NORTH CAMBRIDGE AVE., MILWAUKEE 11, WISCONSIN, TELEPHONE: WOODRUFF 4-1500.**

FOR SALE

1—Multiplex High Production Wire Forming Machine, Model D-10, in good condition. Address: BARNES MANUFACTURING CO., MANSFIELD, OHIO

FOR SALE

#721 Osborn-Jolt Squeeze Stripper, Serial #81686, 800# capacity 22" X 26" Platen Stationary type requires 11" floor pit. Ideal for under Sand Chute. First class condition. Address: ATLAS FOUNDRY COMPANY, MARION, INDIANA.

FURNACES FOR SALE

Ten used heat treating furnaces and two seven ton gantry cranes. Good condition and available for immediate delivery. Address: BAER STEEL PRODUCTS, INC., BOX 1428, BOISE, IDAHO.

FOR SALE

One-third interest in iron foundry. This is a going business in Los Angeles county. Three partners, having a substantial drawing account monthly. Can possibly buy a half interest. Seller retiring. Address: MURPHY, 5921 LEEDS AVENUE, SOUTH GATE, CALIF.

FOUNDRY EQUIPMENT

BLOWERS AND FANS

Spencer Turbo Blower, 4500 CFM @32 oz. Serial 44788—220/440 V., 60 HP, G.E. triclad induction motor. New Dec., 1946.

Propellair type CD, 30″ direct connected 4 blade fan, ½ HP R & M 3/60/220/440 V., 1750 RPM, ring mount.

Similar to above, 4 blade, 28″, 1 HP, G. E., 3/60/220/440 motor

Similar to above, 6 blade, 24″ fan, 1 HP Louis Allis 3/60/220/440, 1740 motor

CORE BLOWERS

2—Demmler 3E Drop Away Draw. type, Serial #1672-2252

1—Air operated Core Rollover

CORE OVENS

1—Coleman Vertical 24″ x 96″ racks, oil fired flametrol Brown recording pyrometer, 36′ height

1—Dispatch Tower, 23″ x 88″ shelves, 31′ high oil fired Brown recording pyrometer

1—Drying Systems, Inc. 24″ x 48″ trays. Oil fired flametrol Brown indicators

1—Dispatch Batch type 4 compartment 2 Burner 9—51″ x 72″ x 60″ racks and hydraulic lift truck

Ovens located in Wisconsin

CRANES

5 Ton P & H Overhead traveling crane, double girder cab operated 30′ — 6″ span 15′ lift, 3 motors 3/60/220 V., A.C., Serial 12946B. New 1946.

10 Ton Northern Bridge Crane, box frame double girder, fish belly, 230 V., D.C. 54′ 7½″ wide C to C of bridge wheels, cab operated 3 motors

6 Ton Shepard Niles Bridge Crane, inner running trolley double girder transfer crane 25′ 2″ span, 10′ lift floor control 4 lifting hoods 6′ 1⅝″ apart. 2 speed 15-30 FPM 3/60/440 A.C. side rails, wiring switches etc., new 1948.

YARD CRANES

Hughes Keenan MC-4 15,000# capacity Truck Crane, solid tires, all weather steel cab and heater. Telescopic boom 12′—18′ gasoline engine. Excellent condition

Krane Kar, 10,000# Model AX, telescopic boom 12′—18′ solid tires, gasoline engine. Rebuilt, guaranteed

GRINDERS

Fox Swing Frame Grinder, with 10 HP G.E. Induction motor 220/440 volt, 60 cycle, 3 phase

HOISTS

500# Electrolift ¾ HP 3/60/220 motor 2″ trolley and current collectors, 15′ lift, 30 FPM

1000# Detroit Monorail Hoist for 3½″ track, 1 HP 3/60/220-440 V. motor push-button control with contactors

1000# Cleveland Tramrail Low Headroom Electric Hoist with trolley and current collector 1½ HP 3/60/220 motor for 3¼″ trolley

2000# Detroit Electric Hoist with 15′ rail for jib crane for wall mounting

6000# Lo-Head Hoist, Model HB3. Rebuilt and guaranteed

AIR HOISTS

2000# Chicago Pneumatic Air Hoist, "Little Giant" Model A. Serial CP330648

4000# Chicago Pneumatic Air Hoist "Little Giant". Serial CP 284433

AIR TROLLEYS

2—Ingersoll Rand 2000-6000# capacity motor driven Trolleys

LIFT TRUCKS

Mobilift Forks—2000# capacity. 30″ load. Centers 63″ collapsed. Height 79″ lift, self starters. Late models

Mobilift Forks 3000# capacity as above late models

Ross 19HT 6000# high lifts 14′ lift 48″ forks, pneumatic tires. Rebuilt guaranteed

Ross 15HT, 15000# capacity 15′ lift 54″ forks 11′ 6″ collapsed height, pneumatic tires. Rebuilt, guaranteed

Baker Hy-lift Platform Truck, 10,000# capacity, Model H5-60 with H36 spec. ready power 27 x 60″ platform

2—Baker 6000# gasoline fork. Lifts KMH 60, 120″ lift, 88″ collapsed height 42″ fork, solid tires. Rebuilt and guaranteed

MELTING EQUIPMENT

5—New Stroman 1000# aluminum Melting Furnaces, Type SD-1. Oil fired manual tilt type completely lined, in original crates, with 3 HP Stroman Blowers.

MOLDING MACHINES

1—Hermann Rollover Pattern Draw 20 x 30″ with bumper 6″ cylinder. New 1942. FOB Erie, Pa.

1—Hermann High Speed Jolt Rollover, 4000#, 36 x 60″ with 32 x 48″ bumper, 13″ cylinder, with pattern device. New 1940. FOB Erie, Pa.

1—Tabor 1000# Rollover Molding Machine 30 x 51″. New 1944. FOB Erie, Pa.

2—Beardsley & Piper Champion Pin Lift push-offs 44″ x 44″ — 12″ draw. New 1948

2—Beardsley & Piper Champion Pin Lift push-offs. 32X36″, 8″ draw

2—Johnston & Jennings Jolt Pin Pushoffs, 8″ jolt cylinder

1—Johnston & Jennings Rollover Draw 30″ x 42″ plate, 12″ draw

1—Osborn Portable Jolt Rollover Pattern Draw model 601-13, 30″ x 24″ flask size, 10″ draw, 900# cap. FOB Ordill, Ill.

1—International 13″ PJS. Jolt Squeeze Molding Machine. Stationary 18x26″ table

4—Champion molding machines JSL-12P

MOLDING UNIT

1—Osborne Jolt Squeeze Molding Machine. Ser. #11791B—23″ x 24″ table and Osborne 814P Rollover. Serial 10953C 17″ x 31″ table. These two machines are a unit with overhead sand hoppers one with belt feed to squeezer, hopper feed to rollover. FOB Erie, Pa.

MULLERS

Simpson #3 Model H Style B Intensive Mixer cooling system and rotary screen, in excellent condition

2—Clearfield #2 Mullers C10 Serial 169A-169B Timken bearings with motors and controls. FOB Erie, Pa.

SHAKEOUT

3′ x 5′ Simplicity Shakeout 3/60/220 motor. Excellent condition. Present location Erie, Pa.

1—Beardsley & Piper speed muller size 40

WHEELABRATOR

1—36 x 42″ American Wheelabrator Series 370 tumblast. Used very little 15 HP main motor 3/60/330/440 V.

ACME EQUIPMENT CO., INC.

126 S. Clinton St. Chicago 6, Ill.

Phone: ANdover 3-3430

CLASSIFIED ADVERTISING

YOUR CLASSIFIED ADVERTISEMENT IN FOUNDRY BRINGS RESULTS!

♦

IF YOU ARE SEEKING A CHANGE OF POSITION TO BETTER YOUR SITUATION AND ARE QUALIFIED FOR A BETTER JOB, TELL THE 45,000 READERS OF FOUNDRY ABOUT IT.

♦

DON'T "HIDE YOUR LIGHT UNDER A BUSHEL"—THERE ARE TIMES WHEN A MAN SHOULD TALK ABOUT HIMSELF AND THERE ARE A LOT OF MEN QUALIFIED FOR BETTER POSITIONS WHO DO NOT KNOW HOW TO GO ABOUT IT OR WHERE TO SEEK HIGHER RESPONSIBILITIES.

♦

YOUR CLASSIFIED ADVERTISEMENT IN FOUNDRY WILL BE WIDELY READ AND THE RESULTS MAY SURPRISE YOU!

♦

IT COSTS BUT LITTLE, WHY NOT RUN AN ADVERTISEMENT ABOUT YOURSELF IN TWO OR THREE ISSUES?

* * *

WRITE

FOUNDRY

CLASSIFIED ADVERTISING DEPT.

PENTON BLDG., CLEVELAND 13, OHIO

For Sale

LATE TYPE EQUIPMENT JUST RELEASED

1—BEARDSLEY & PIPER Stationary Sand Slinger 19" Head—2 Speeds—Used 9 Months ..... $3875.

1—21 Cu Ft. PANGBORN Rotoblast with Loader. Excellent condition... $7500.

3—28A DAVENPORT JOLT ROLL-OVERS ..... $1950 ea.

1—MAHON Aluminum Heat Treating Furnace 9' x 18' x 1000°. Complete with controls—Gas Fired Circulating Unit ..... $5750.

1—CHAMPION #400 Core Blower.... $1975.

3—#20 G INTERNATIONAL Jolt Rollovers ..... $ 450 ea.

LAND-WHITEHEAD EQUIPMENT CORP.
P.O. BOX 756 (PHONE 54379)
READING, PENNA.

SURPLUS EQUIPMENT & COMPLETE PLANTS PURCHASED

FOR SALE

TURBO BLOWERS WITH MOTORS

CFM	PRESS.	MAKE	CFM	PRESS.	MAKE
6750	24 oz.	Spencer	675	16 oz.	Spencer
4500	16 oz.	G.E.	660	20 oz.	A-B
4000	32 oz.	Spencer	500	10 oz.	No. Am.
3500	40 oz.	Spencer	400	4.3 oz.	Spencer
2800	1 oz.	Spencer	400	16 oz.	Spencer
2700	16 oz.	No. Am.	340	20 oz.	A-B
2700	16 oz.	Spencer	320	12 oz.	Spencer
2500	7 oz.	Sturt.	225	16 oz.	Spencer
2200	16 oz.	No. Am.	180	15 oz.	Spencer
2000	2½ oz.	Spencer	9100	7" SP	Sturt.
2000	1 oz.	Spencer	1100	4½" SP	Bayley
1150	20 oz.	No. Am.	100	7" SP	Spencer
800	8 oz.	No. Am.			

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVE.
CLEVELAND 14, OHIO

For Sale

OPPORTUNITY FOR ALUMINUM FOUNDRIES

Outright sale basis in protected territories. Manufacturing rights and complete production patterns (aluminum match plates) master flasks, etc., for casting aluminum (with steel uprights) ornamental entrance railings in the popular sizes. The system, developed by a practical foundryman is Pat. Pend. and is available to foundries in areas which will not conflict with his own sales. This railing is far superior to the welded type, yet competitively made. Price averages under $1,000, depending on the exclusive area desired. Not offered just as a fill in for occasional dull jobbing, but as a profitable line of your own. For further information, Address: Box 430, FOUNDRY, Cleveland 13, Ohio.

SAND RECLAIMING SYSTEM

Link-Belt complete unit consists of 2 storage bins with vibrators, sludge tanks and pumps, gas fired sand dryers, 2 bucket elevators, with 2 Clearfield mullers. Complete electrical controls. Original cost over $200,000.00. Priced to sell at a small fraction of original cost. May be seen in place at Erie, Pennsylvania.

ACME EQUIPMENT CO., INC.

126 S. CLINTON ST. CHICAGO 6, ILLINOIS

PHONE ANDOVER 3-3430

FOR SALE

4—Whiting 3-Wheel Slag Buggies with single end shank—4.5 cubic foot capacity. Excellent Condition. $200 each, F.O.B. Milwaukee, Wisconsin.

MID-CITY FOUNDRY COMPANY
1521 WEST BRUCE STREET
MILWAUKEE 4, WISCONSIN

For Sale

FOR SALE

36 x 42" Wheelabrator. Priced right.
Rollovers; Hermans, Davenports, Osborns, Johnston & Jennings, etc.
Sandslingers—2 Tractor Type—1 Mobile.
Strippers: Davenports, Johnston & Jennings.
Jolt Squeezers: Osborns, SPO, Tabor, Milwaukee.
Speed Muller #60-41, Skip Hoist, etc.
Grinders: 20 HP to 3 HP.
Allis Chalmers 8500 CFM Centrifugal Blower.
2000# Hausfeld Oil Fire Aluminum Furnace.
7—#94 Monarch Melting Furnaces.
2 Ton Electric Crane, 18' span.
4—Johnston & Jennings Jolt Squeezers, Stripping Plate #2, 16" Squeeze Cylinder.
Complete Overhead Sand Handling System with 2—#3 Simpson Mixers.
SEND FOR OUR LATEST LIST #1052.

UNIVERSAL MACHINERY & EQUIPMENT CO.
320 EAST BROAD STREET
SHILLINGTON, PENNA.
PHONES—READING—30311—40146
R. B. HARRISON, FDRY. MGR.

FOR SALE

1—Milw. Jolt Pin-Lift, 32" x 38" Table—New
4—SPO #110 P.J. Jolt Squeezers
8—Melting Furnaces, #70 Cruc., Gas Fired
1—Fisher #400 Furnace, Elec. Tilt, Gas Fired
2—Fisher Blowers, Size J 30
1—Roots Blower—Size ½ Hood & Exhaust System over Melting Area With ABC Series 30 Exhaust Fan
2—#400 Sil. Carb. Crucibles
1—Six Ton Cap. Crane
1—Thwing Elec. Pyrometer
3—Bench Rammers
287—Iron Pouring Weights

THE LIQUID CARBONIC CORPORATION
3100 S. KEDZIE AVE. CHICAGO 23, ILLINOIS
BI-7-8000 P. A. FIRNBACH

FOR SALE

1—Internation Type PK Jolt Squeeze Pin Lift, 18" Cylinder, 8" Lift.

RAY P. SCULLY
SCULLY MACHINERY & EQUIPMENT CO.
767 MILWAUKEE AVE. CHICAGO 22, ILL.
PHONE: CANAL 6-0314

FOR SALE

1—#405 Osborn Rollover and Pattern Draw Molding Machine.

1—International Type GS Jolt ram, rollover and pattern draw 28" x 36" table, 1000# jolt capacity.

1—6000# Herman Rollover & Pattern Draw. Rollover 42" x 90", 5400# cap. Jarring Machine 40" x 84" table and plate, 9400# cap.

7—#601-13 Osborn Jolt Rollover & Pattern Draw Molding Machines.

6—#2047-4 Osborn Jolt Rollover & Pattern Draw Molding Machines for cylinder head core production.

1—30" x 40" Tabor Jolt Rollover, 1000# cap. 12" draw.

1—#147 Osborn Rockover & Draw Machine for long jobs.

4—#814-P Osborn Jolt Squeeze Pin Lift Molding Machines.

3—#2166 Spo Jolt Squeeze Pin Lift Molding Machines.

5—Champion Draw Power Pushoff Machines 10" draw, 38" x 40" table.

1—#1 Demmler Core Blower—New.

1—#3 Demmler Core Blower—A-1 cond.

9—#92 Osborn Core Blowers.

1—Kane & Roach Wire Straightener, 3/16" to ½" wire, 7½ HP. 440V.

1—3 H.P. double stand grinder, belt driven.

2—3 H.P. Blowers for Furnaces 16 oz.

2—50 H.P. Spencer Turbine Cupola Blowers 7350 CFM 16 oz. 220/440V/3/60.

1—20 H.P. North American Turbine Blower, 1900 CFM, 24 oz. 220/440/3/60.

4—International Type JFL Jolt Ram, Foot Lever lift molding machines.

1—4' x 10' Robbins Shake-out with 7½ H.P. motor.

2—Jeffrey Type 3 Vibrators for shake-outs.

3—Tumbling mills 30" x 60".

1—500# Monarch Aluminum Hand Tilting Furnace.

1—Eclipse Salt Bath Furnace, M-225 gas fired.

1—Revolving Core Conveyor Table—Like new.

2—Fin Cleaning Machines (Ireland) for cleaning cylinder heads.

1—Pig Mold Conveyor 74' lg. (Link Belt) complete with drive.

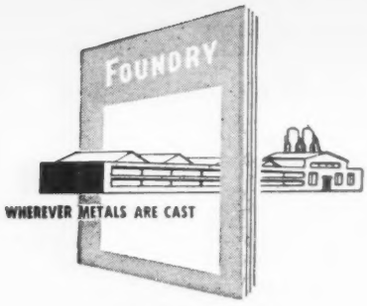
1—Jones Worm Gear Reducer, drive shaft 900 RPM, Ratio 8 to 1. Mounted on C.I. Base with 15 H.P. Motor 3ph. 60cy. 440V. 1150 RPM.

2—Micromax Instruments Leeds & Northrup Temperature Control.

Various sizes steel flasks and Hines Popoff flasks and jackets. Various sizes of transite & aluminum core plates.

EUCLID FOUNDRY & MACHINE EQUIPMENT CO.

15019 Saranac Rd., Cleveland 10, Ohio **Telephone—GLenville 1-1538**



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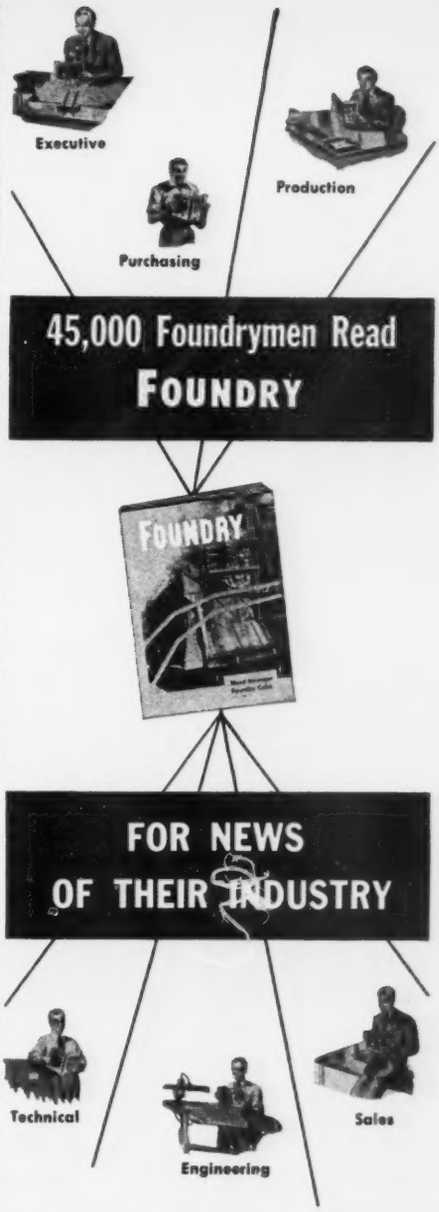

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Since 1907 your purchase of Christmas Seals has helped cut the TB death rate substantially.

Yet the threat and problems of tuberculosis are still enormous.

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So, please, send in your contribution today. Keep the fight against TB a winning one!

Buy Christmas Seals!

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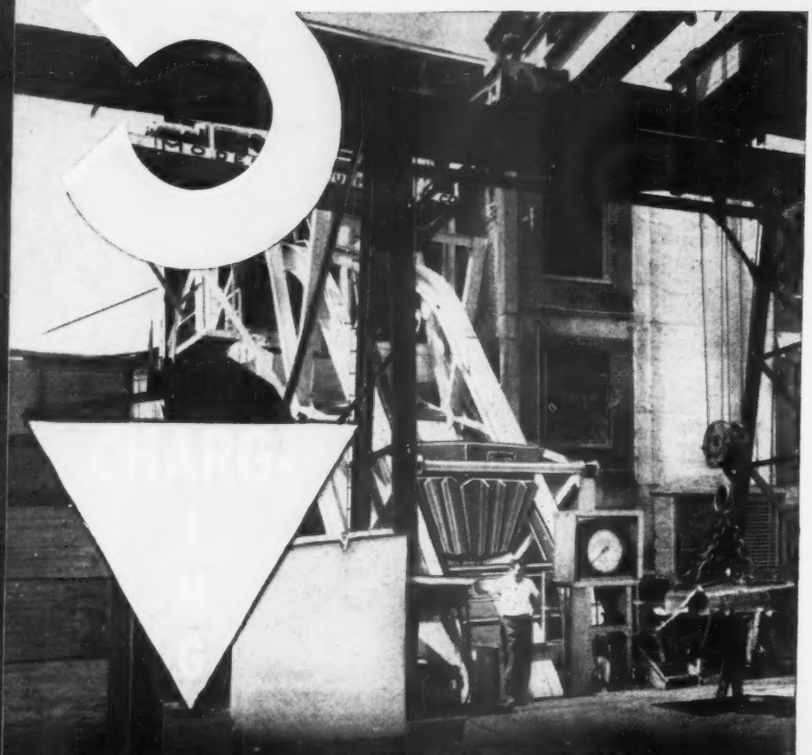

Truss type, swivel charger with SMALL-CONE SIDE-DISCHARGE bucket serves two MODERN cupolas. Between the cupolas and pouring ladles metal flows through geared, reservoir ladles to covered, distributing ladles.

CHARGING...MELTING and POURING

operations require closer synchronization now than ever before in foundry history: Today TIME AND METAL are on the march to prove that right will conquer might. So in the new year every casting will have to be counted toward the building up of the $4 billion volume we'll be needing. 90%* of all our durable goods will be using castings. In channeling this vital flow of metal from yard to mold MODERN engineers have acquired some valuable, foundry know-how! Literature and sound, color films are available free to all foundrymen who sincerely believe that increased tonnages—RIGHT NOW—will play a big part in bringing about peace on earth...

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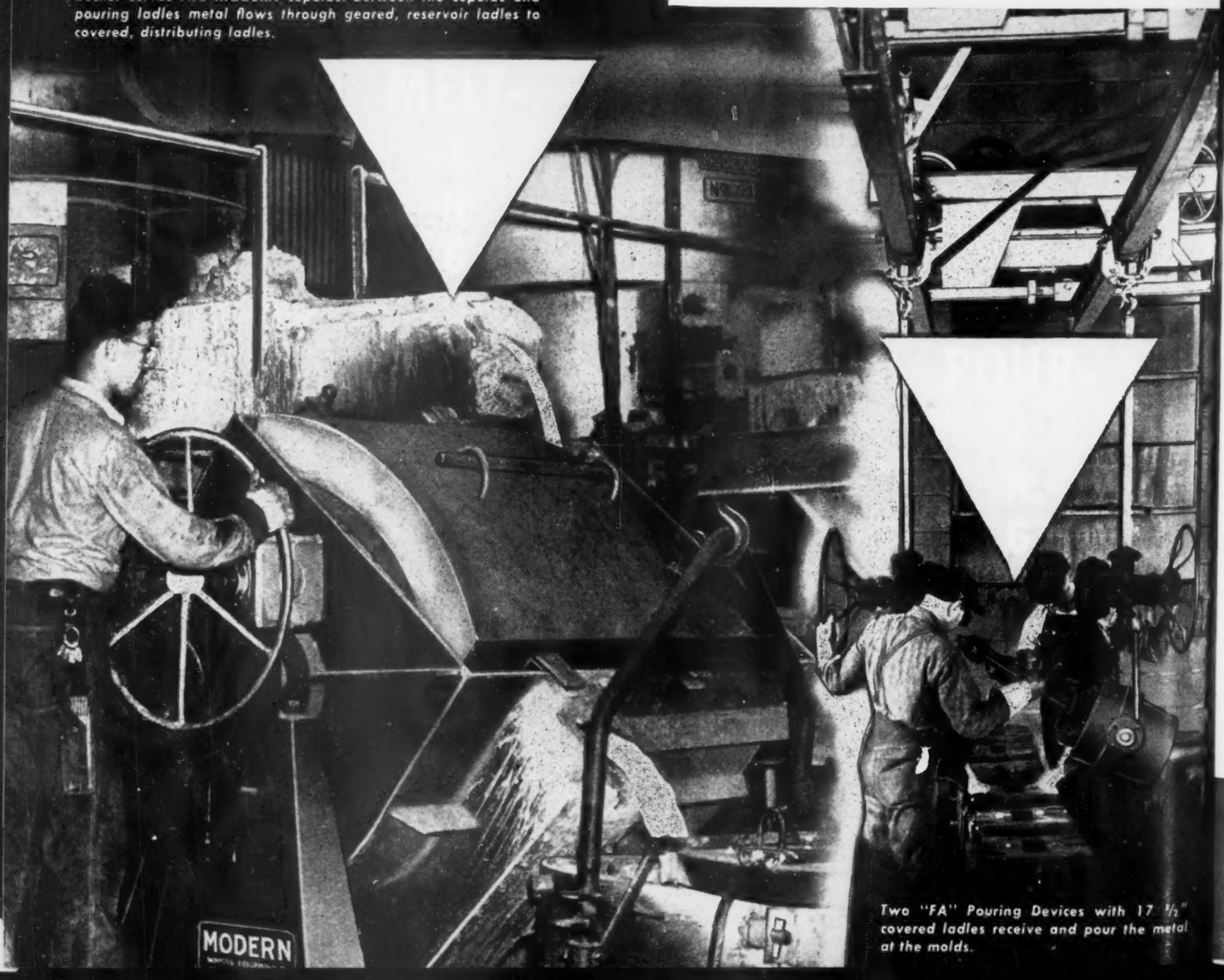

Two "FA" Pouring Devices with 17 ½" covered ladles receive and pour the metal at the molds.

Best Wishes for a Happy Holiday and Prosperous New Year

Our 70th Yuletide Message to Our Customers and Friends

We of Frederic B. Stevens Inc., wish you a most joyous Holiday Season and unbounded good fortune during the coming year.

We wish to thank you for entrusting your business needs to our organization. We are deeply grateful for the loyalty you have shown to us . . . and we are proud to count you among our friends.

So please accept these Holiday Wishes for health, happiness and good fortune . . . and add to them a sincere "Thank You" from all of us at Frederic B. Stevens Inc.

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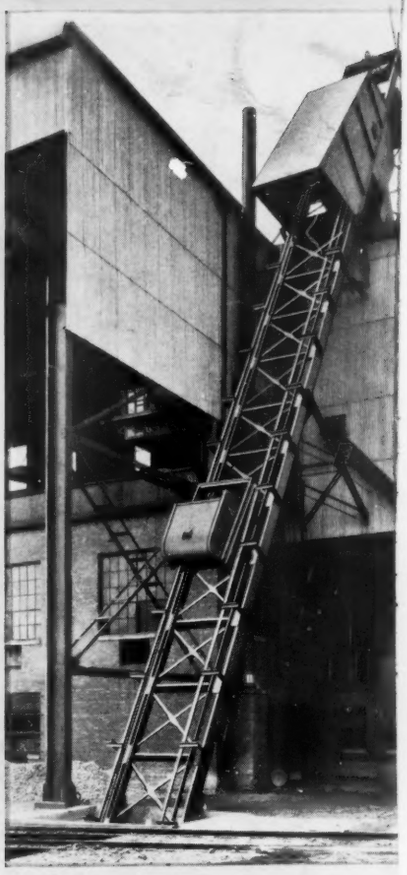
3) . . . and emptying into an automatic larry car that distributes the materials to the proper overhead storage bins . . .



4) . . . have proven in large, medium small sized foundries that . . .

coke and limestone handling

Skip Hoists

Minimize breakage of lumps; assure low cost handling; low maintenance and dependable, fully automatic operation

● Why pay a premium for carefully selected, sized coke — and then break substantial amounts of it into breeze before charging it to the cupola? Bartlett-Snow Coke and Limestone Skip Hoists have handled *millions of tons* of these materials. Some installations have been in practically continuous service for twenty-five years. Our engineers will gladly show you what these skip hoists can do. Let us work with you on your requirements.

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CLEVELAND 5, OHIO

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Foundrymen Who Know — Buy Bartlett-Snow

FOUNDRY

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1952

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Ed—Editorial **Q & A—Questions and Answers** **FD—Foundry Developments**

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